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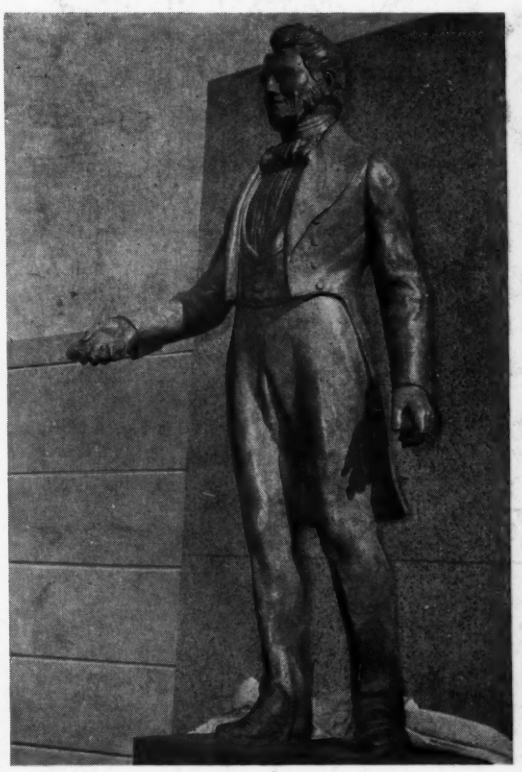
MOTOR AGE

CHILTON PUBLICATION
VOTED TO THE INTERESTS OF THE INDEPENDENT REPAIR SHOP

MARCH
1939

IN THIS ISSUE



Bronze statue of Charles Goodyear, presented to the city of Akron by the Goodyear Tire & Rubber Co., in observance of the one hundredth anniversary of the discovery of vulcanization. See news story on page 40.

How Tight Is Tight?

Why a tension wrench is an important gadget to have if you want to eliminate guess work when precision counts.

Remote Control

A helpful story with plenty of pictures to help you in adjusting the Chevrolet remote control gear shift assembly.

Astounding NEW

Six Porto-Power Models in 1939 line. Prices range from $63.95 to $240.00. (Slightly higher on West Coast and in Canada). Order from your jobber—or write for 'Round-The-Shop Profit Guide.

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4. Press Work of All Types
5. Axle and Frame Straightening
6. Removing Frozen Hinge Pins
7. Body Work and Rebuilding
8. Straightening Bent Bumpers
9. Aligning Doors with Body
10. Squaring Window Frames
11. Removing Axle Bearings
12. Re-arching Sagged Springs
13. Reconditioning Used Cars
14. Straightening Turret Tops

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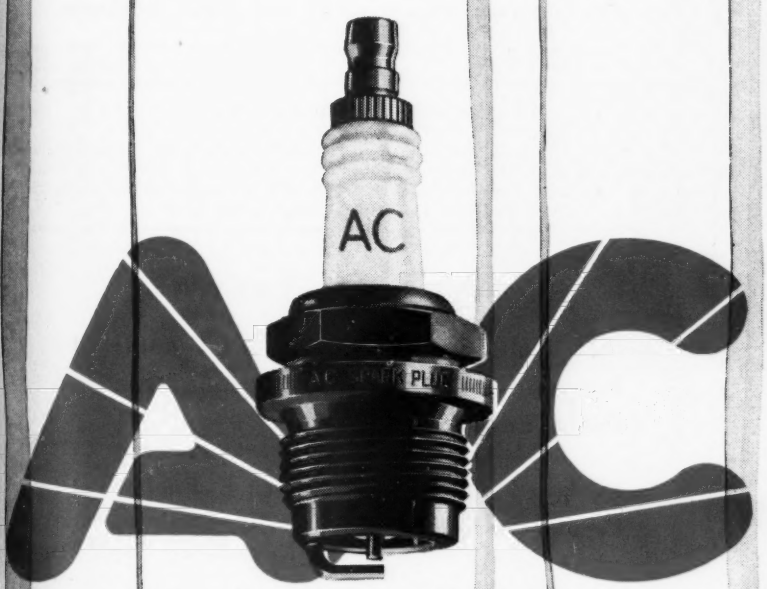

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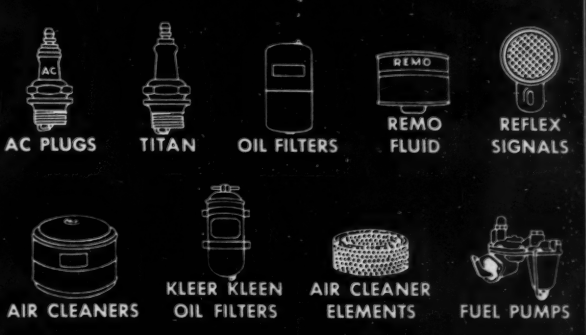

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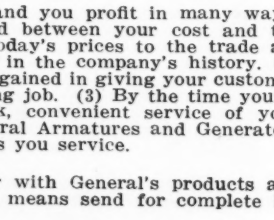

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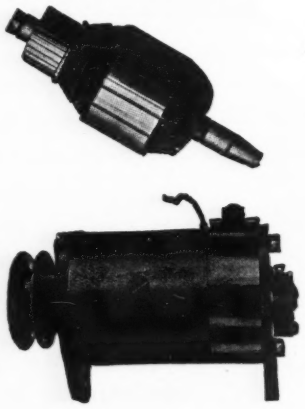

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MOTOR AGE

DEVOTED TO THE INTERESTS OF THE INDEPENDENT REPAIR SHOP

Subscriptions for Motor Age are accepted only from independent repair shops and their employees.

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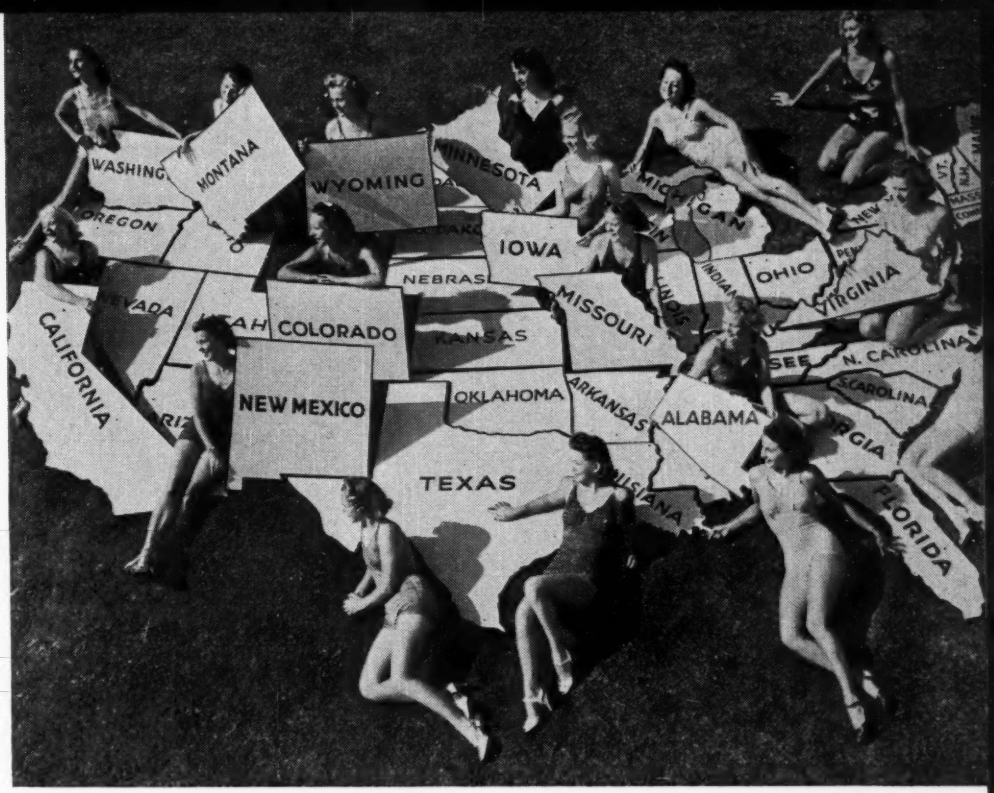
MARCH, 1939



SHOP TALK

Coast to Coast

All over the United States, shops should be getting ready for spring service and with car owners driving to the world's fairs there should be plenty of business for the repair shops that are prepared and that go after the business.

Orchids

It's the omissions not the competition that puts anybody out of business writes Rudy Honkavaara in an applauding letter on Jack Beater's article "Tune-Up or Shut Up" which brightened up the February issue of MOTOR AGE. My verbal sparring partner, Cal Crooks, from Springfield, Mass., also liked the same story for he writes that I must have had a couple of aces up my sleeve, to pull two such swell articles as Beater's and Ben Ikert's in one issue. Both of those men must have outstanding position in the automotive field to be able to write so authoritatively, concludes Cal. Well, Ikert certainly has had plenty of background. For many years he was technical editor of MOTOR AGE, then after a session with various manufacturers of tune-up equipment he has returned and is now a contributing editor. Jack Beater's background I don't know so well, but he is boss of his own shop down in Ft. Myers, Fla., and sure knows his stuff.

Ahead of Time

It's interesting how some stories click. Take for instance a story on servicing the Chevrolet knee action unit that appeared way back in 1934, right after the job was announced. No one ever wrote in a word about it. But during the last few months there is hardly a mail that doesn't have at least one letter requesting the dope on servicing those units. Probably the story was just five years ahead of its time. But it's a wonderfully good argument for holding on to back issues and keeping a card index on the various articles.

Frame Diagrams

Requests for frame diagrams are also interesting. Just about a year I had a hunch that they would be hot stuff so I asked the subscription salesmen to sound out the readers. The reports were rather lukewarm, but I started printing them anyway. Now judging by the letters, if I printed a dozen each issue it wouldn't be too many.

Anniversary

Charlie Barton and the Missus, who operate "Barton's—the Oldest Garage in Michigan," have gotten out a swell piece of publicity celebrating their silver anniversary. They started in business in 1914, and the folder announcing the anniversary shows a picture of the original shop and as it looks today. To give the human touch there is a picture of Charlie and his wife taken 25 years ago. Good luck to both of them, say I; may you both celebrate the golden anniversary!

Setter Righters

"Will the mechanics, who never go to the trouble to find out, ever stop taking a rap at Ethyl gasoline?" queries Earle Kellington of Kenney, Ill., and at the same time setting me straight on the cause of the grayish color in the oil that was bothering Adolph Matthes of Lawrence, Mass. Earle says it's caused by too rich a mixture which dilutes the oil. Heat from the engine vaporizes the gas, leaving the lead which discolors the oil. Sounds reasonable Earle, sounds reasonable. Paul Hoffman also wrote in to prove to me what caused the gray color of the engine oil. Paul even had some of the crankcase drainings analyzed to prove his point. But it doesn't hurt the lubricating qualities of the oil.

Bill Toboldt

Tension Wrench Specifications

Passenger Cars

	Cylinder Head Bolts and Studs, Ft.-Lbs.	Connecting Rod Bolts, Ft.-Lbs.	Main Bearing Cap Screws, Ft.-Lbs.	Rocker Arm Cap Screws, Ft.-Lbs.	Spark Plugs, Ft.-Lbs.
Buick 40	65–70	45–50	115–220	30–35	.....
Buick 60, 80, 90	65–70	60–65	115–220	30–35	.....
Cadillac V-8	70–75	55–60	130–140	.....	35–40
Cadillac V-16	70–75	55–60	100–110	.....	35–40
Chevrolet	65–69	.....	104–108	27–31	.....
Chrysler	*52.5–57.5	52.5–57.5	75–80	.....	.....
De Soto	*52.5–57.5	52.5–57.5	75–80	.....	.....
Dodge	*52.5–57.5	52.5–57.5	75–80	.....	.....
Ford V-8, Cast Iron Head	50	.....	.....	.....	.....
Ford V-8, Aluminum Head	40	.....	.....	.....	.....
Ford V-8 60	30	.....	.....	.....	.....
Graham	40–45	37–41	90	.....	.....
Hudson 6	45	52	92	.....	28
Hudson 8	54	52	92	.....	28
Hupp	53	53	53*	.....	.....
Lincoln-Zephyr	40	.....	.....	.....	21–25
Nash 3810-20	61–63	50–55	66–70	.....	.....
Nash 3880	61–63	50–55	70–73	.....	.....
Oldsmobile	65–70	30–35	135–145	.....	.....
Packard 6-8-12	60–63	59.5–60.5	81.5–85.0	.....	.....
Packard Super 8	58–60	66.5–69.0	66.5–69.0	.....	50*
Plymouth	*50–55	52.5–57.5	75–80	.....	.....
Pontiac	60	45	85	.....	.....
Studebaker, Cast Iron Heads, 1936-1939	83.5	54	91.5	.....	.....
Studebaker, Aluminum Heads, 1936-1939	66.5	54	91.5	.....	.....
Terraplane 6	45	52	92	.....	28
Terraplane 8	54	52	92	.....	28
Willys	60–65	50–55	65–70	.....	28–30

*Chrysler —Cylinder head cap screws plain head, 60-65 ft.-lbs. Cylinder head cap screws cupped head 62.5 to 72.5 ft.-lbs.
*De Soto —See Chrysler Note.
*Dodge —See Chrysler Note.
*Hupp —Applies to rear main bearing, others 82.5 ft.-lbs.
*Packard —Applies to 10 mm. spark plugs only.
*Plymouth—Applies to cylinder head nuts. Cap screws 60-65.

Trucks

	Cylinder Head	Connecting Rod Bearings	Main Bearings
GENERAL MOTORS			
216, 223, 230, 239, 257, 286	63	....	....
331, 400, 450	66	....	....
479, 529, 707	92	....	....
HERCULES			
NX, IX	42	42	77
ZX	42	23	77
OO	52.5	52.5	105
QX	52.5	38.5	*59.5 **70
JX	52.5	52.5	*59.5 **70
WX	52.5	105	*70 **105
YX, RX	52.5	105	*105 **122.5
RXL	73.5	157.5	175
HX	105	262.5	*192 **210
DOO	157.5	140	*77 **94.5
DJX	157.5	140	*77 **94.5
RX	5/8 in. 175 1 in. 280	157.5	175
DHX	11/16 in. 175 1 3/8 in. 350	262.5	*192.5 **210
INTERNATIONAL Harvester	7/16 in. 56 1/2 in. 66.5 5/8 in. 93	7/16 in. 56	1/2 in. 75 9/16 in. 75 5/8 in. 93
LYCOMING			
AFE, AEF, ASE	52.5-56	....	....
BF	49-52.5	....	....
REO			
S140, S209	58-60	48.7-52.5	87.5-98
S228, S3-268, S3L268, S5-309	62.5-64.5	71-75	66.6-75
WAUKESHA			
6BK, 6MS, 6ML, 6MK, 6MZ, 6BKH	65-80	65-80	45-55
6-110, 6RS, 6SRL, 6SRK, 6125, 6D100	65-80	90-110	45-55
6GAK	90-110	100-120	45-55
6RB, 6D140, 6DA140	90-110	90-110	45-55
WHITE	3/8 in. 22.5-26 7/16 in. 43.6-47.3 1/2 in. 61-65 9/16 in. 87.5-96.5	....	....

* Center and Rear.
** Front and Intermediate.

How Tight

IF you take a set of inside mikes and adjust them so that they will just stick longwise in a cylinder and press the cylinder block with your hands, the mike will drop through. That is a pretty graphic illustration of how easily a cylinder block can be distorted and since a block can be distorted to that extent by the pressure of the hands (and it doesn't take much), imagine what happens to the cylinders when someone puts a piece of pipe on the end of a wrench and "gives it the works."

Anyone can pull up a nut. But no one can guess how tight that nut should be pulled and so far no one has discovered a mechanic that can tighten two nuts of the same size evenly. What of it? Well, in the answer lies the reason why many car owners trade in their cars rather than have a cylinder head removed. For unless cylinder head nuts or cap screws, main and rod bearing cap screws and other important bolts and nuts are tightened evenly and to the proper tension, friction will be increased, performance and power decreased, gas and oil mileage will go haywire, valves will burn, head gaskets leak, cylinder head and block may crack and the life of pistons, rings and valves shortened.

That's a lot of trouble—all of which can be avoided by the use of a modern tension wrench.

It is interesting how easily the effects of uneven tightening of bolts and nuts can be demonstrated. By placing a dial gage in the cylinder bore, the distortion can be measured when the sides of the block are pressed together by the hands and it will be found that it doesn't take much effort to distort the block 0.002 in.

To see how much the block is distorted when the cylinder head is bolted in place, remove the pistons from the cylinders and measure the diameter of the cylinder, both crosswise and lengthwise. Then, install the cylinder head pulling up the nuts in the usual manner. Again measure the diameter of the cyl-

The question of how much the various bolts on an automobile should be tightened is now answered by the modern tension wrench

By BILL TOBOLDT

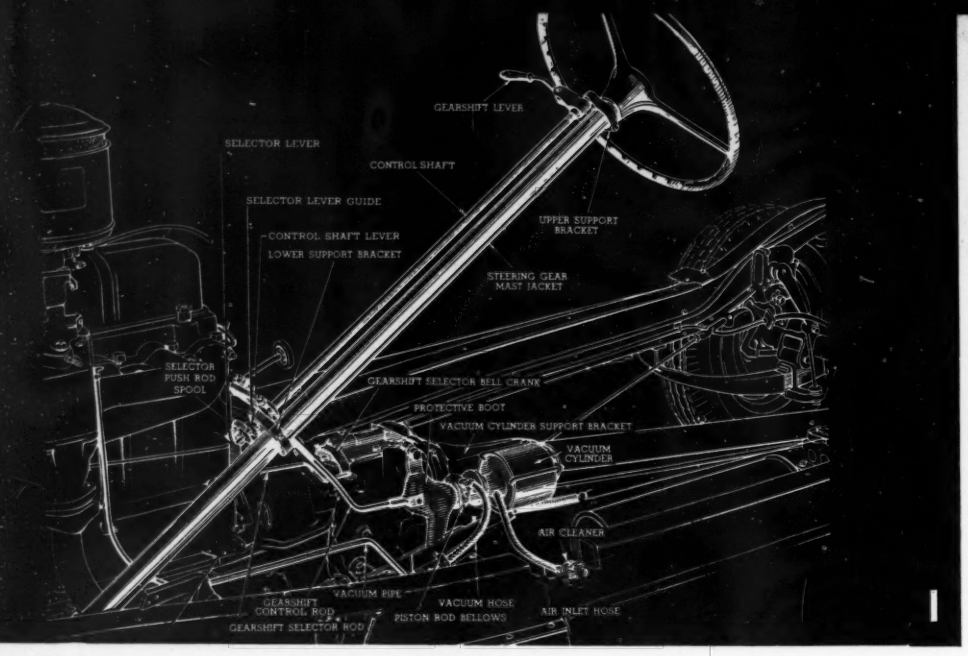
inder at the same place in the bore as before. Naturally, the amount of distortion will vary with different engines but, 0.003 in. is not unusual and when it is recalled that piston clearance on most engines is about 0.0015, one can readily imagine the extra friction that is set up.

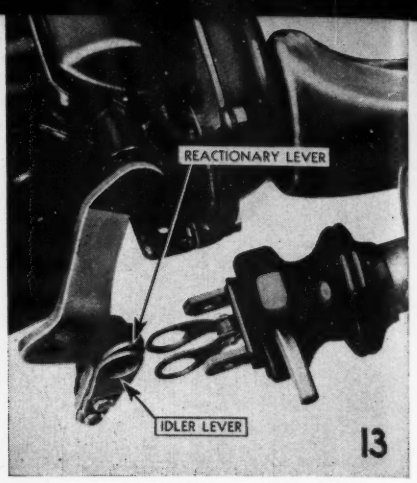
Another test is to jack up the rear wheels on a car that has been overhauled, start the engine and place the transmission in gear. Have the engine running at a speed of about 7 m.p.h. Keeping the throttle set at that speed, tighten all the cylinder head cap screws in the usual manner. Note the speedometer reading. Go over the cylinder head cap screws with a tension wrench and tighten them in accordance with factory specifications. The increase in the speedometer reading will be the result of reduced friction of the pistons and main bearings and reduction of compression losses past the pistons and valves.

In addition to cylinder head nuts, connecting rod bearings also suffer a great deal from being pulled up too tight. Take a look at the factory specifications that are shown on this page and it will be seen that most of them are approximately 50 ft.lb. That is another way of saying that if the wrench is one foot long, the pressure on the end of the handle should be 50 lb. That is not very much and when you consider that it is commonplace practice to pull up connecting rod bolts as tight as possible, you can readily see why overhauled engines are so tight. What happens is that the tension on the bolts tends to distort the end of the rod and the bearing.

When discussing tension wrenches, some mechanics say—"Oh yea, what about nuts that turn down hard. In many cases it takes almost the specified tension to turn the nut before it comes down against the cylinder head." The answer to that one is easy—the nut or cap screw should be freed up first or replaced with new ones.

Don't take a chance on spoiling an otherwise good job by pulling up the nuts too tight or unevenly.

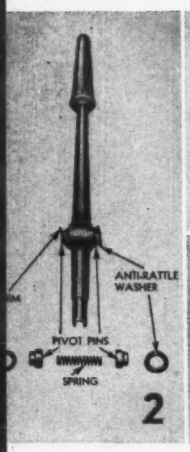


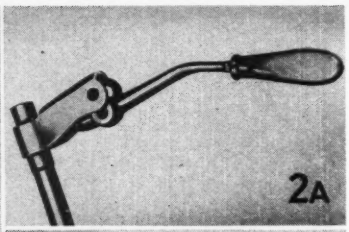


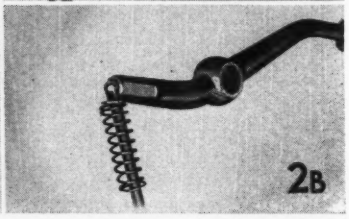
By BOB HA

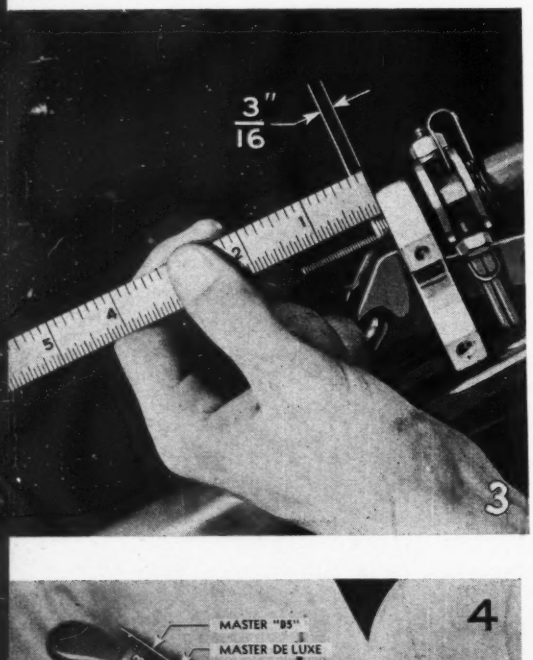
Remote

Instructions for adjusting the gear shift and





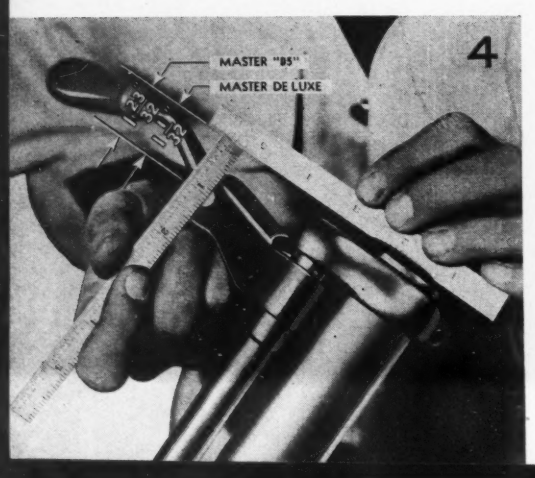


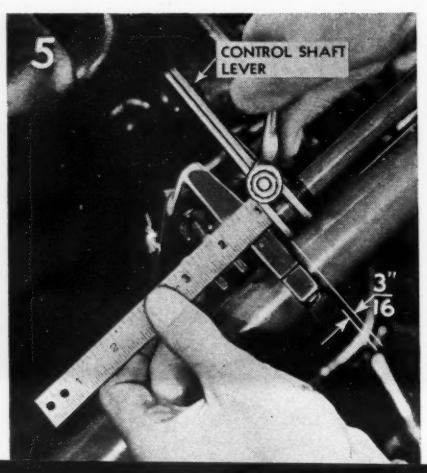


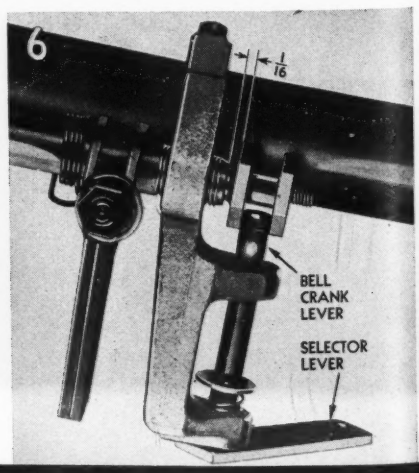
1. To remove the gear shift lever and control shaft assembly: remove steering wheel and the spring which retains the mast jacket bearing. (Master DeLuxe models only.) Remove the "U" clamp holding the steering column to the instrument panel, and push the toe-board grommet up on the steering column. Disconnect the selector rod from the selector lever, and the gearshift control rod from the shift control lever. (Refer to Fig. 1.) Remove the lock nut and the selector control lever guide from the end of the selector control shaft. Remove the screws from the lower support bracket and unscrew the bracket from the control shaft. Loosen the clamp on the control shaft lever and remove it and the counterbalancing spring from the lower end of the control shaft. The control shaft with the gearshift lever may now be removed.

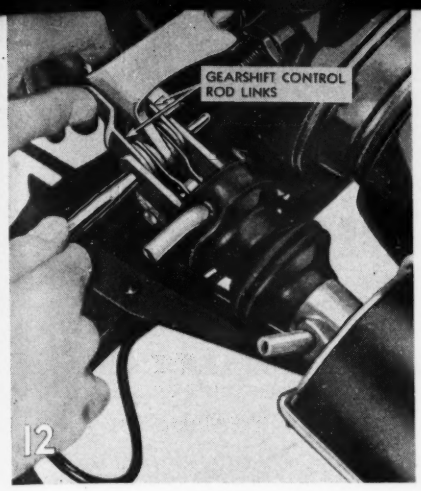
2. Remove the gear shift lever from the control tube by pressing in on the pivot pins on each side of the housing and working the lever downward. The pivot pins are held in the lever by a coil spring, as illustrated, and care must be used so the pins and the washer and shim do not fly out when the lever clears the housing. Reassemble in reverse order, slipping the open end of the lever into the control tube and over the end of the selector push rod. Before reinstalling the control tube and shift lever assembly on the steering column, check the location of the upper support bracket with reference to the top of the mast jacket. The measurement from the top of the bracket to the top of the mast jacket should be ⅜ in. on Master DeLuxe models and 1 3/16 in. on Master "85" models. Make sure the keyway in the bracket mates with the key projecting on the mast jacket before tightening the bracket screw. Then thread the control shaft through the hole in the instrument panel bracket and through the toeboard grommet, and assemble the counterbalancing spring and shift control lever on the lower end of the control shaft, slipping it up on the "D" section as far as possible.

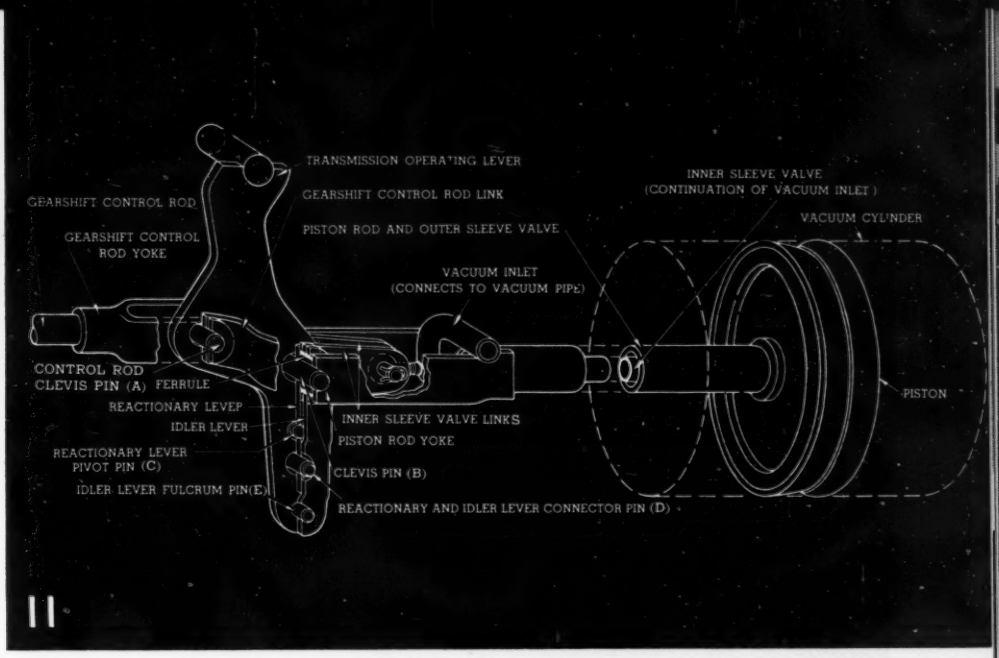
3. Screw the lower support bracket on the control shaft until the shaft extends beyond the bracket 3/16 in., as illustrated. Then enter the end of







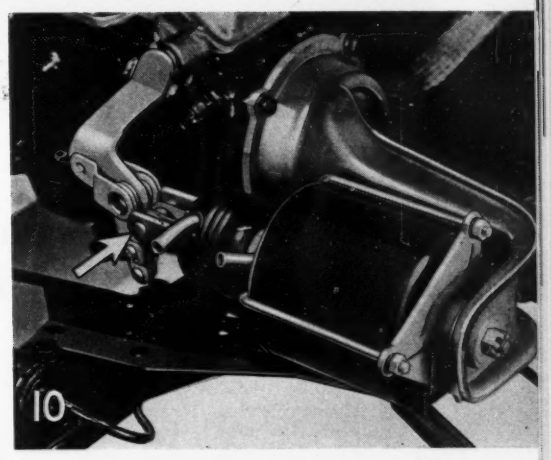




HANKINSON

Control

trouble shooting on this '39 Chevrolet unit



the control shaft in the upper support bracket. Allow the end of the counterbalancing spring to drop in behind the mast jacket; then install the lower support bracket on the mast jacket, being careful to mate the keyway in the bracket with the key on the mast jacket. Install the bracket cap and tighten the screws snug.

4. The next step is to check the height of the gear shift lever in relation to the top of the mast jacket. Place a straight edge across the top of the mast jacket and measure from the straight edge to the center of the gear shift lever pivot pins. This distance should be 1 1/32 in. on the Master DeLuxe and 1 23/32 in. on the Master "85". The lower support bracket may be shifted up or down on the mast jacket to secure the above measurement. Then tighten the lower support bracket screws.

5. Adjust the shift control lever up or down on the control shaft to secure 3/16 in. clearance between the lever and the lower support bracket, and then tighten the shift control lever clamp bolt securely. Hook the counterbalancing spring under the lever.

6. With the end of the selector lever bell crank in the groove of the selector lever guide, screw the guide on the selector control rod until there is 1/16 in. clearance between the upper face of the guide and the end of the shift control shaft. Install the guide lock nut and tighten securely.

7. To adjust the mast jacket for proper height, loosen the mast jacket clamp at the steering gear housing and measure from the shoulder on the steering shaft to the end of the mast

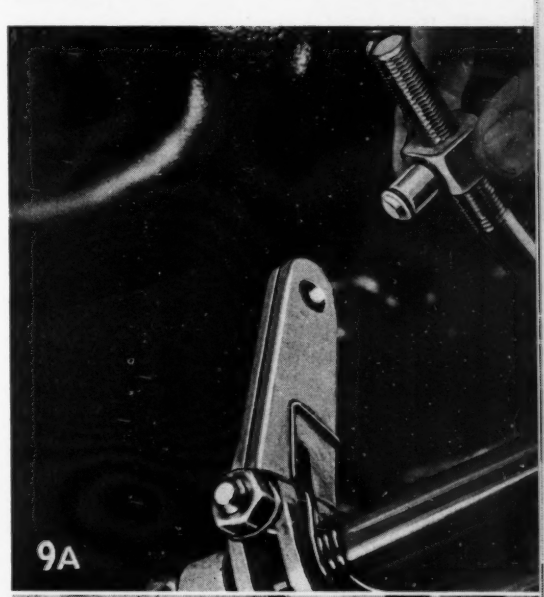
(*Continued on page* 73)

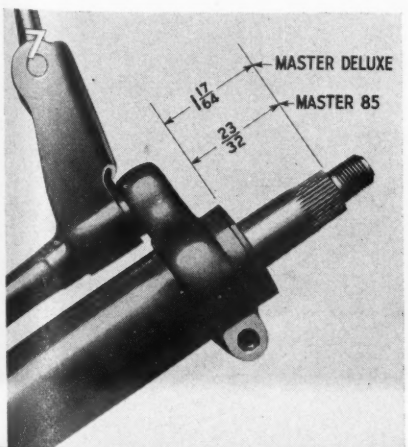
Trouble Shooting

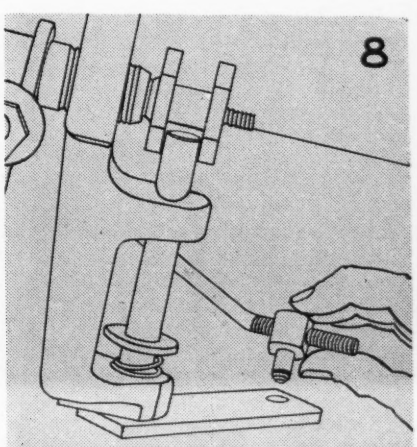
If the shift feels "sticky" when selecting gears, it may be due to binding of the pivot pins in the gearshift lever bracket, roughness or burrs in the bracket, a bent selector rod, a bent selector lever on the transmission or insufficient clearance between the upper face of the selector control lever guide and the end of the control shaft.

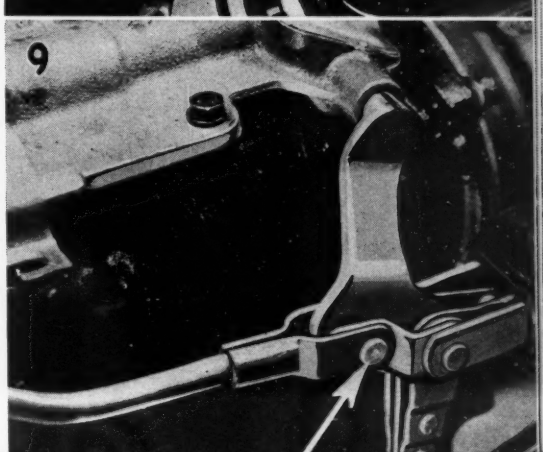
Hard shifting may be caused by leaks in the vacuum line and its con-

(*Continued on page* 80)









Catch 'Em at the Pump

By MARSHALL PERHAM

(Left) The brake adjustment and wheel alignment indicators beside two main batteries of gasoline pumps at Waggoner's. (Below) Tools and accessories are grouped in a gas-pump show case. Accessory items that may be unknown to the motorist are thus brought to his attention.

This western shop boosts brake service and wheel alignment through showmanship alone

AT Waggoner's, in Los Angeles, the motto is—"Catch 'em at the pump." In this way, they sell two service jobs that are sometimes allowed to slide along undone, and accessories that are almost never bought unless they are first seen. This is all accomplished with almost no verbal salesmanship; at least, with none of the high-pressure variety that probably turns away customers as fast as it sells jobs.

The two service jobs group together: brake adjustment and wheel alignment. Instead of placing their testing racks in some obscure corner, they are located where they must be driven over before the main pumps can be reached. When the car stops for fuel, indicators show whether or not brakes and wheels are adjusted properly.

If anything is out of true, approaches of different types may be made to the driver. If he is a steady customer, the attendant simply tells him what is wrong, and shows him the result in worn tires.

Non-customers usually comment on what a fine station it is, for, in truth, there is no more modern plant anywhere in Los Angeles. This leaves an opening to talk service. The alignment meters are mentioned at once.

"These are to give you a brake and wheel alignment test every time you come in," the attendant explains. "We don't let you learn the costly way that your brakes or wheels need adjusting. We give you a free test whenever you buy gas. Just make a fairly sharp stop for more accurate reading, watch the meters, and you'll save a lot on tires."

If there is bad adjustment present, he usually follows by suggesting that there is. If not, he shows the customer how to read the meters, and tell when danger of wear is indicated. So impressive is this service that many customers who have known the expense of cutting tires with bad wheels or brakes, often become steadies on the strength of it. This retroactive feature is probably worth more than all the immediate jobs sold.

Besides this, there is a department featuring a very complete line of tools, parts, accessories, etc. Patently, it is impossible to display them, and consequently, many customers might never know they existed, where there not three gas pumps fitted with glass show-cases.

If a customer sees something he wants, the attendant asks him to come to the show room.

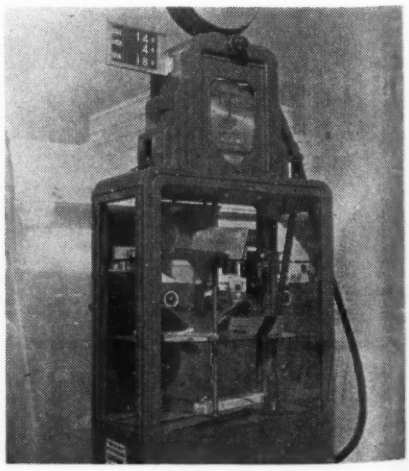
"We have a couple of different styles to choose from," is the way he justifies this request.

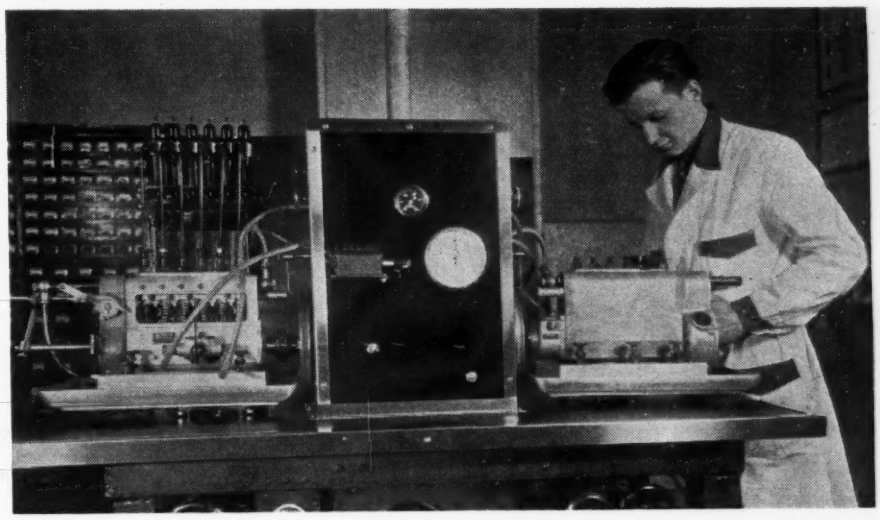
Once inside, the extensive display of fine parts, tools, and accessories often convince the customer that here is something else he ought to have, and sales are further stepped up. If not, he at least knows what an extensive stock is available.

Note particularly, there is nothing in any of this selling campaign that smacks of high pressure. The customers are shown dramatically and convincingly what they need, and with perhaps a word or two of encouragement, the sale is made. But the customer almost makes it himself.

All this selling is done at the pump, the one place where every car, be it foreign-built limousine or a dory of Detroit that subsequently has been hopped-up in the hen-coop, must visit regularly.

They have featured not standard products or services, but those that customers either don't know they need, or don't want until they see.





(Right) The Diesel pump unit test stand. The aluminum base that holds the pump unit has adjustable thumb screws to hold the unit tightly, and by means of the hand wheel may be raised or lowered for perfect shaft alignment. Speed control is conveniently located near adjusting wheel with tachometer above on cabinet.

(Lower left) The nozzle test stand has a power-ventilated hood to carry off fumes when testing nozzles under high pressure. Pressures as high as 1700 lb. may be developed.

(Lower right) And how do you like this array of tools on the work bench? Looks like Diesel service is an art.

Designed for Diesels

Your shop may look like this eventually If Diesel demand continues to develop

By C. E. PACKER

THE adoption of Diesel power by many truckers has set many service men to *thinking* about equipping their shops for Diesel service—but in Chicago, the Illinois Auto Electric Co. has *done* something about it.

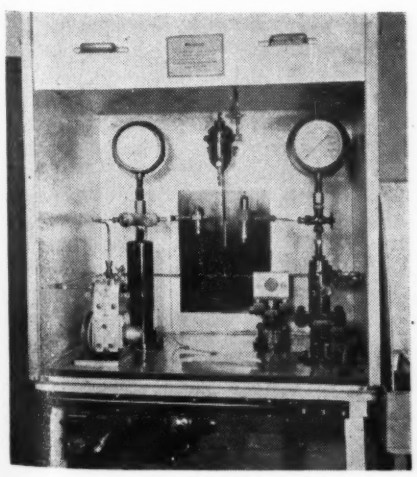
"Our customers fairly forced us into Diesel service," said Joseph Sirotek, president of the company, "for, in our more than 20 years in the field of engine tune-up and electrical work, many have just jumped to the conclusion that we service every kind of unit used on internal combustion engines. Now we're glad they did, for we have a specialized Diesel department so laid out, equipped, and manned that we are even authorized to do factory warranty work for Bosch, thus saving customers the annoyance and expense of returning parts to the factory, and at the same time building volume for us."

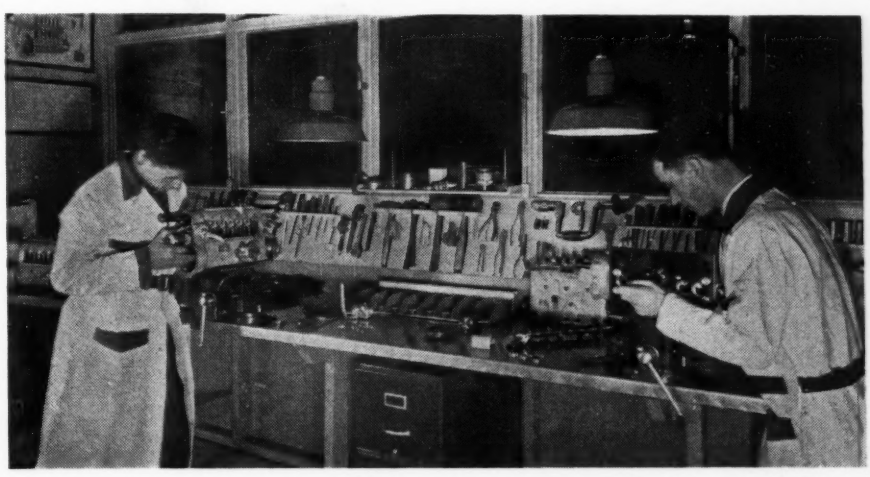
Precision and cleanliness mark the new department. A combination of natural and artificial light plus a most scientific layout of tools and equipment makes for nearly perfect working conditions. The room itself is designed to eliminate dust, since this might upset calibrations of pumps or injure precision nozzles.

Plans for the new room have been under consideration for more than a year, and the pictures show the combined ideas of Joseph Sirotek and his associates and the engineers of the United American Bosch Diesel division. It was the hope of all concerned that this might not only be a service depot, but would also serve as a model shop where others who are interested in this increasingly important service might come and get ideas that they could put into practice. Visitors are always welcomed.

Most of the shop equipment is of Bosch design. The calibrating stand is unique in that it is a

(Continued on page 82)





Legally Speaking

By

C. R. ROSENBERG, Jr.

Each month MOTOR AGE presents on this page a lawyer's interpretation of Federal and local court decisions of interest to repairmen. A knowledge of how the law regards these various situations may help you keep your shop from being on the wrong end of a lawsuit some day.

"Demonstration" Goods

When equipment, appliances or other merchandise is left in the home or business place of a prospective customer for "demonstration" purposes, what happens to the "demonstration" goods if the prospect goes into bankruptcy or his assets are seized by attaching creditors? Ordinarily, the fact that the demonstration goods are in his possession would give rise to the presumption that they are his.

Recently, a customer, after having goods in his place on demonstration for a considerable period of time, entered into a bailment lease with the seller of the goods. Before the bailment lease was paid up, the customer was thrown into Federal receivership. At that point the seller of the goods was obliged to petition the Federal court to get them back. Fortunately, the law of the particular state permitted the owner of goods on bailment lease to repossess them in such circumstances, and so the Federal court ordered the return of the merchandise.

Ordinarily, when a business house leaves goods with a customer "on demonstration," it may repossess them, even after they have been attached by the customer's creditors. Safe practice, however, suggests that when the goods are left on demonstration, the prospect sign some sort of paper acknowledging that the goods are simply loaned to him for demonstration purposes. This supplies written proof of the true state of affairs in the event of subsequent litigation. Goods sold and delivered on open account ordinarily cannot be rescued from the customer's attaching creditors, even though they have not been paid for. Usually title to goods sold on open account passes to the customer upon delivery. The only right left to the seller, ordinarily, is a suit for the purchase price.

The three legal methods of selling on time payments are bailment lease, conditional sale and chattel mortgage. Each is designed to protect the seller until the goods are paid for. However, these three legal devices are not equally "safe" in all states. Best plan for seller is to make sure that he is using the safest plan of installment selling in each state in which he is operating.

Partner's Knowledge

What one partner knows, all partners know, according to law.

Recently a member of a partnership entered into a contract with respect to certain subject matter that another party had previously contracted for, although the partner had no knowledge of the prior contract. When the partnership undertook to enforce its contract, it was confronted with the fact that the parties under the previous contract had prior rights.

It developed that a "silent" member of the partnership had known of the previous contract. This knowledge, the court thought, was attributable to all the partners.

This rather technical case simply means that if partner A has knowledge or notice of certain facts, partner B cannot avoid legal liability by pleading ignorance of those facts, although he may really have had no knowledge of them at the time he entered into the disputed transaction on behalf of the partnership. Partner B is supposed by law to have the same knowledge or notice of pertinent facts that partner A has.

Exclusive Agency

A contract whereby a garage owner is given the exclusive agency for a certain brand of merchandise may not be as protective as it seems. A Federal Court recently decided that a so-called exclusive agency contract was not binding because of "uncertainty."

In that case a manufacturer wrote and signed the following memorandum:

"For and in consideration of one dollar and in further consideration of Jones (naming the dealer) pushing our XYZ brand, we hereby agree that we will give him the exclusive agency for XYZ in his state."

At the time this memorandum was signed the dealer ordered a large quantity of the merchandise which the dealer subsequently sold. Later, the manufacturer informed the dealer that he had sold his entire line to another dealer in the same state and declined to fill any more orders.

"The consideration of one dollar recited in the contract was insufficient to support any promise to give an exclusive agency contract," said the United States Court passing on this point. "The contract, if such there was at all, was terminable at the will of either party."

The Court pointed out that the so-called exclusive agency agreement contained no promise by the dealer that he would push the goods for any specified period of time, nor was there any promise by the manufacturer to continue the exclusive agency to any definite date. Hence, since there was no specified time during which the exclusive agency was to run, the Court felt that the contract was invalid because of "uncertainty."

This decision follows the general rule of law that a contract, in order to be enforceable, must set forth in a definite way all its essential terms.

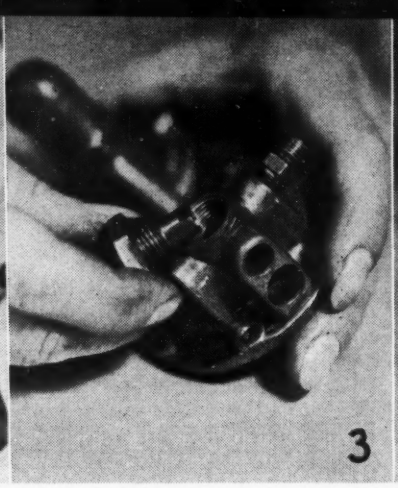
No Insurance Protection

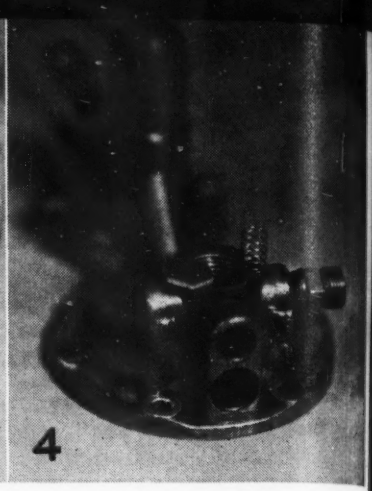
A business house whose automobile was involved in an accident where several people were injured, was sued by the injured parties. The jury gave a verdict of $7500 against the business concern.

This verdict ostensibly was covered by an automobile liability insurance policy. It turned out, however, that the insurance company had no liability for this particular accident—all because of the unauthorized action of the employe who drove the car, an action of which his employer had no knowledge until after the accident occurred.

(*Continued on page* 64)

"It's our own safety device—at 40, there's a light on the speedometer; but at 50 the wheels fall off!"





Servicing the A C

By ***BOB TURNER***

1—After removing strainer bowl, gasket and screen, remove the six screws holding cover assembly to body.

2—Remove cover assembly from body.

3—Remove check valve retainer.

4—Remove check valve and spring.

5—Remove air dome, check valve and spring.

6-7—Remove both check valve seats by chipping out.

8—Threaded tool is used to push new check seats into place. Arrow indicates seat. Knurled tool is used to peen seat after installation in housing.

9—To peen seat after it is installed in housing, leave tool used for pushing seat in place in the housing and tightened against seat.

10—After seats are peened in place burnish face of seat with tool shown.

11—Assemble parts of diaphragm assembly in order shown.

12—Use special fixture to align the disks.

13—When replacing diaphragms assemble washers, spring and oil seal in the order shown.

14—Remove bottom cover, gasket and screen from vacuum pump.

15—Remove vacuum pump assembly from pump body.

16—Assemble vacuum pump diaphragm assembly in order according to numbers on illustration

17—Remove plate holding check valves in vacuum pump body.

18—Replace check valve seat in vacuum pump body.

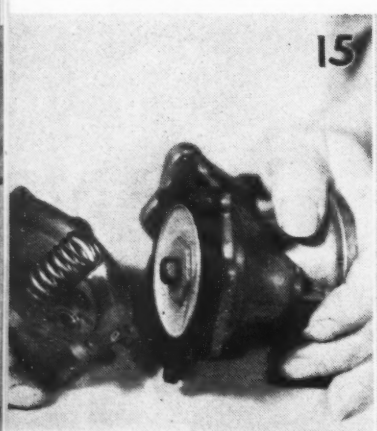
19—After replacing check valve seat in vacuum pump body burnish seat with burnishing tool.

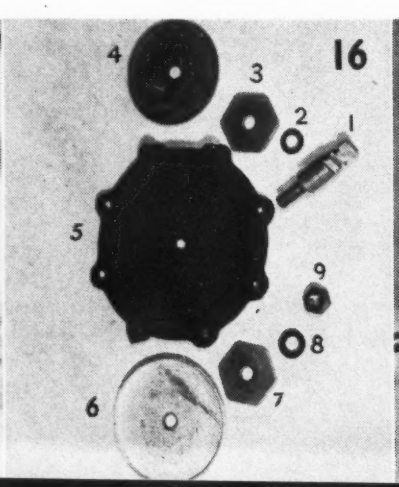
20—Either replace or burnish seat of brass valve retaining plate.

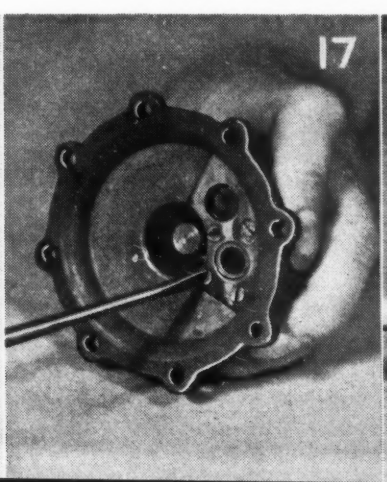
21—In reassembling diaphragm assemblies to main body be sure diaphragm rods are properly entered in operating levers.

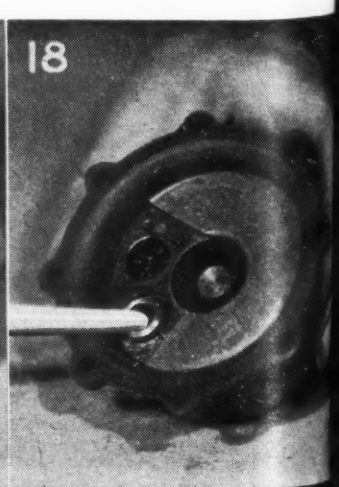
22—After reassembling pump. check diaphragm travel with special tool.

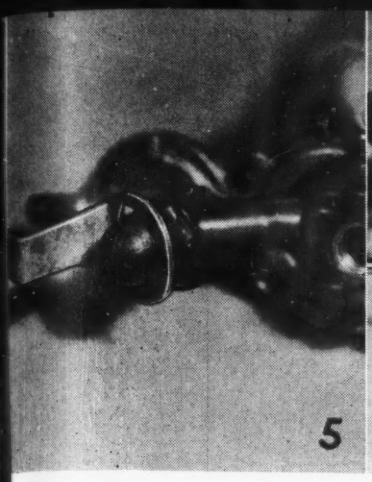
General—Replace all gaskets, valves, springs and seats. Clean all parts thoroughly with gasoline or acetone. After pump is assembled to car, check fuel pressure.

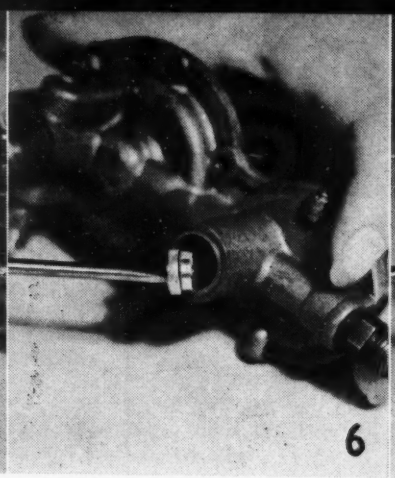


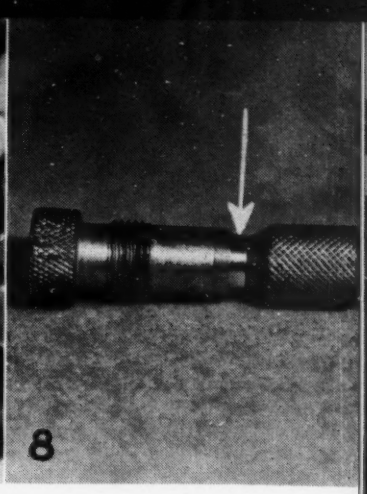




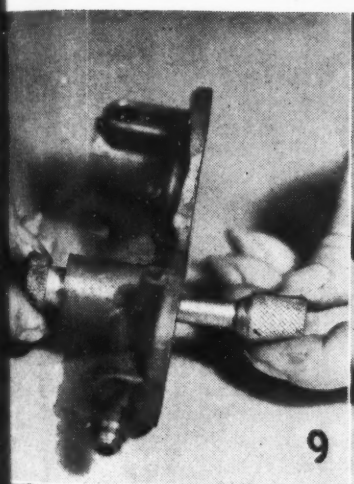


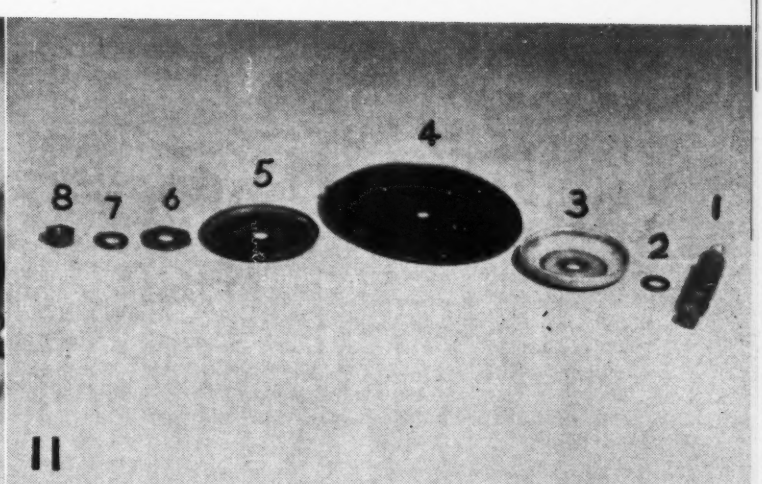


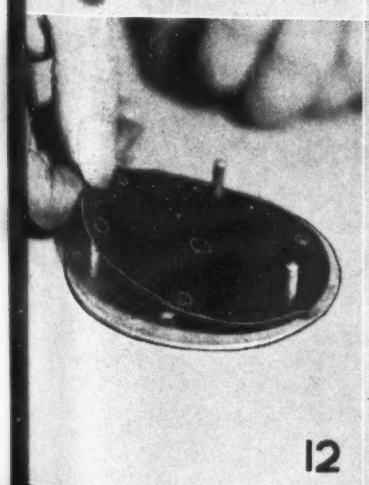


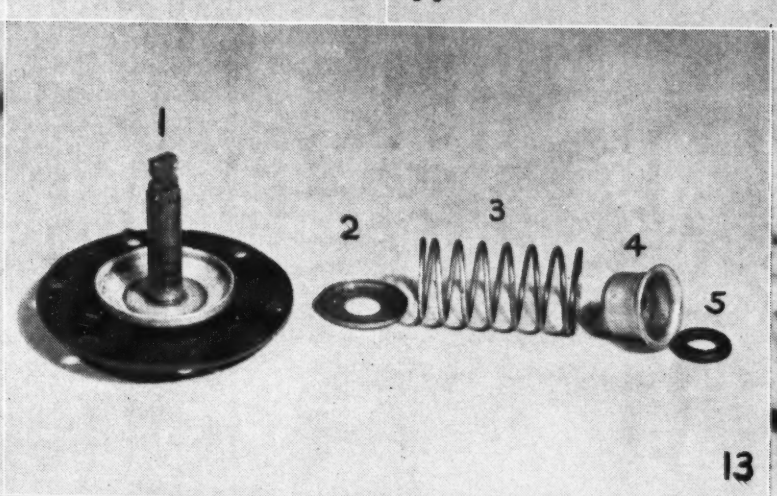


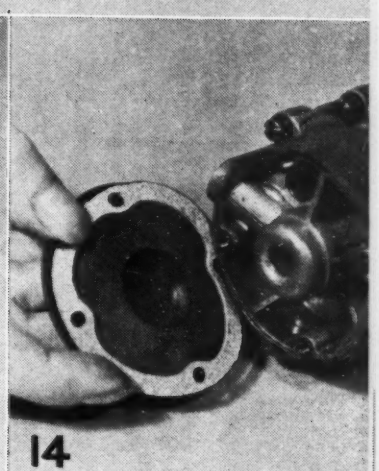
Fuel and Vacuum Pump

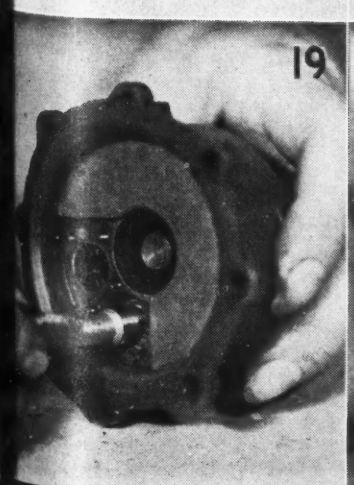


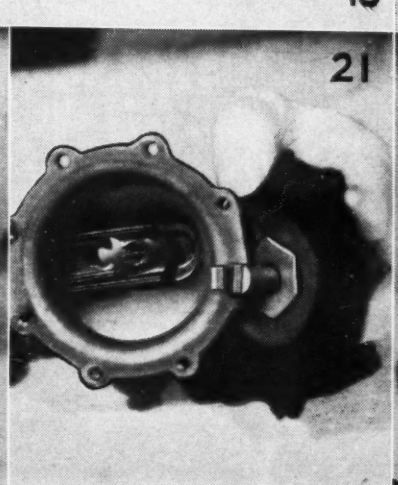


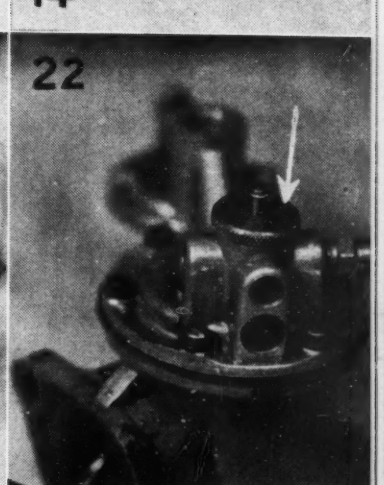












Service Hints from The Factories

Propeller Shaft Leather Seal

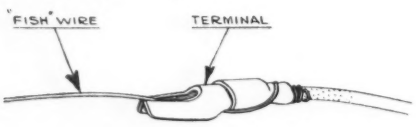
The leather seal which is installed behind the Propeller Shaft Bushing on 1937, 1938 and 1939 passenger cars may be used in place of the cork seal on the ½-ton Chevrolet trucks in cases where grease leakage past the seal is encountered.

Horn Wire Noise—1939

When driving over rough, choppy roads a tinkling noise may be heard in the steering column on early production 1939 Pontiac cars. This is caused by the horn wire tapping against the steering column jacket. The horn wire which is now being used has a soft insulation which reduces this noise to a minimum.

First type horn wires can be taped to prevent noise by using the following method:

1. Attach a "fish wire" to the horn wire and bend the lower termina' as shown below.



2. Remove the steering wheel and remove the horn wire insulator and upper bearing using care not to damage the insulator. If the insulator is damaged it must be replaced.

3. Wind three layers of friction tape around the horn wire at 6 in. intervals.

4. Use the "fish wire" to draw the horn wire back through the steering column taking care that the insulator is inserted into the steering column jacket so that the horn wire will lay in a straight line at the lowest part of the steering column jacket. This will prevent its catching on the steering shaft when the steering wheel is rotated.

Exhaust Manifold Valve Thermostat

It has been called to our attention that in some cases, because of variations in the number of coils of the Manifold Heat Valve Thermostat on Chevrolet engines, it is being replaced to eliminate rattle in the Exhaust Manifold Valve. Changing of the thermostat because of this factor may not correct the difficulty as the number of coils in the thermostat may vary several turns depending on the manufacturing source.

Installations of an anti-rattle spring, Part No. 602799, as outlined on page 157 of the 1938 Chevrolet Shop Manual, should be made rather than replacement of the thermostat itself.

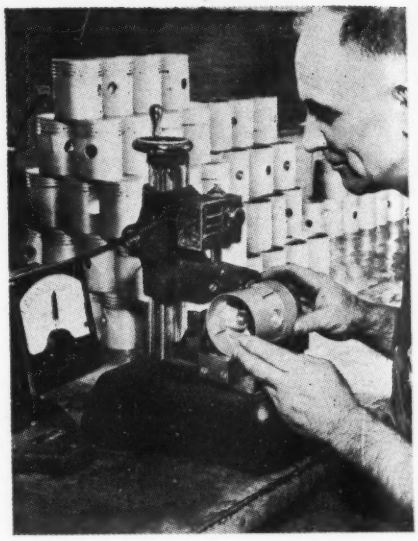
Important—

When installing this anti-rattle spring, care should be taken to make certain the spring rests against the "stop pin" when the counterbalance weight on the Manifold Heat Valve Shaft is 3/16 in. above the "heat on" position.

Speedometer Drive Gear Changes

In order to give accurate speedometer readings on the model 5C Studebaker President and 9A Commander cars equipped with 6.50 tires, the following parts should be used:

1—Where the 18 tooth pinion has been used, use the 17 tooth pinion.



Precision instruments like the one shown above enable workmen on the De Soto engine assembly line to grade pistons to the ten-thousandth of an inch. Such accurate measurements are taken to insure perfect fitting between the cylinder bore and piston, where a clearance of five ten-thousandths of an inch is required.

2—Where the 17 tooth pinion has been used, use the 16 tooth pinion.

When making these changes refer to the speedometer chart on page 71 of the 1939 Shop Manual, so that when ordering speedometer drive gear pinions, the latest tooth combinations will be used.

Rattle at Steering Tie Rod Auxiliary Arm and Bracket

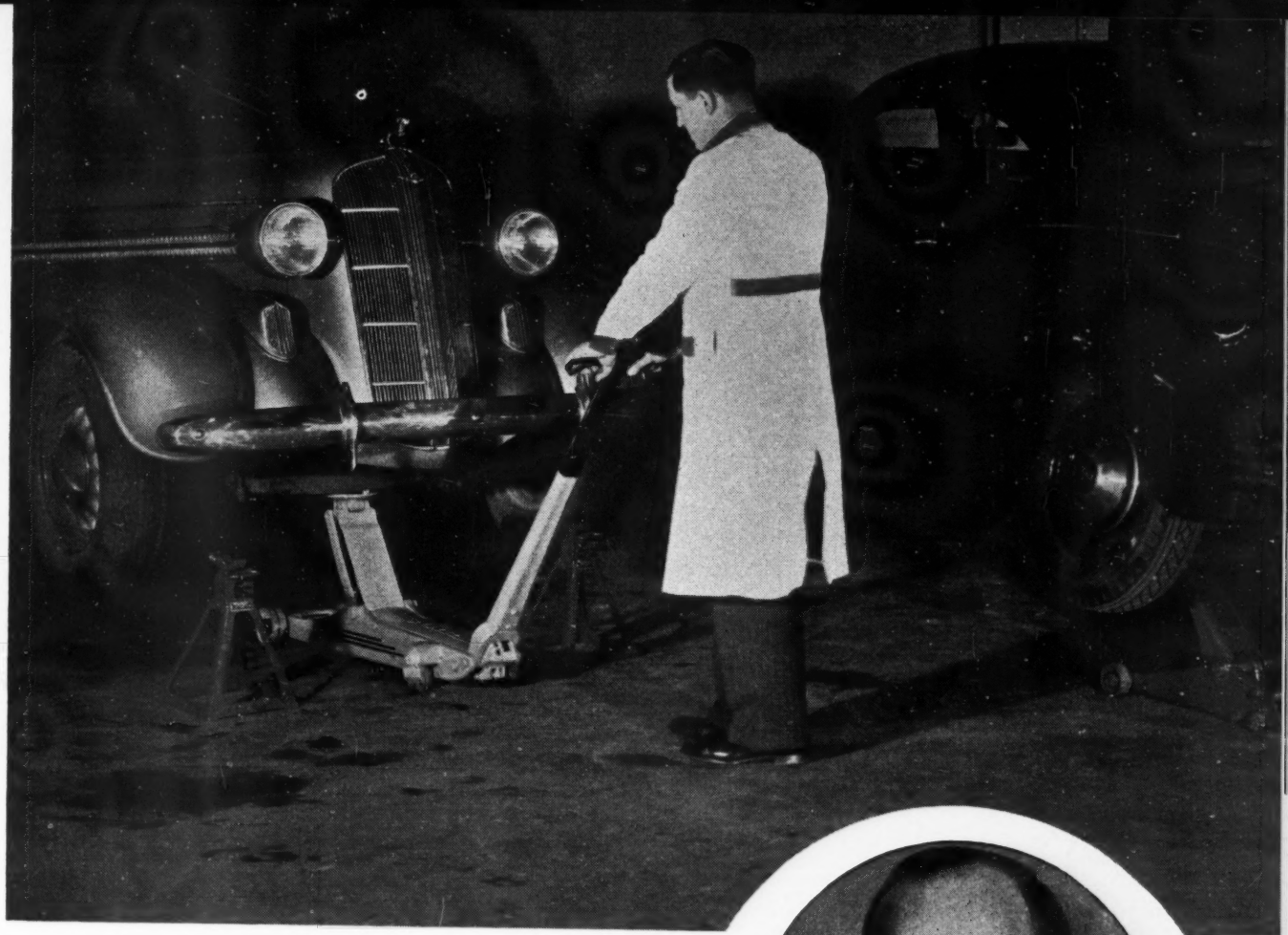
If a rattle develops in the 1939 Models 9A Commander and 5C President Studebaker steering gear, it may be the result of excessive clearance at the tie rod auxiliary arm and bracket.

To provide in production additional precaution against a condition of this kind, a spring washer, Part No. 196,-591, has been added on the upper end of the lever, between the lever and the bracket. The use of this spring washer necessitated shortening the length of the hub at the lever and also shortening the bushing 3/64 in.

In service a practical correction for the condition is to reduce the up and down play of the arm by the installation of shims, rather than to install the spring washers.

Lubricating Concealed Hinges

Engine oil should not be used to lubricate the concealed hinges used on 1939 Pontiac bodies. Oil will drain out of the hinge and will soil the trim or may get on clothing. A special grease gun having a curved nozzle and a small tip has been developed for lubricating these hinges. A lubricant having a viscosity similar to No. 2 or No. 3 cup grease should be used as lubricant of this consistency will not have a tendency to become soft and drip out of the hinge assembly.



THE READERS' CLEARING HOUSE

of

Service Men's Queries

Replacing Plymouth Main Bearings

I have been a reader of Motor Age *for a long time and am always looking for short cuts and time saving hints.*

I read your reply to Mr. E. W. Werner of Warren, Ill., on page 28 of the January issue, in which he asks if the main bearings can be replaced in a 1934 Plymouth without removing the engine. In your reply you said that mains could be replaced without removing the engine or crankcase, but that it is necessary to remove the timing chain cover in order to remove a bolt that extends through the front engine support. This bolt interferes with removing the main bearing cap and the bolt has to be removed before the cap will come down.

That is very true but, in order to remove the timing chain cover, it is also necessary to remove the radiator and lower fan pulley and that, you know, is a lot of work.

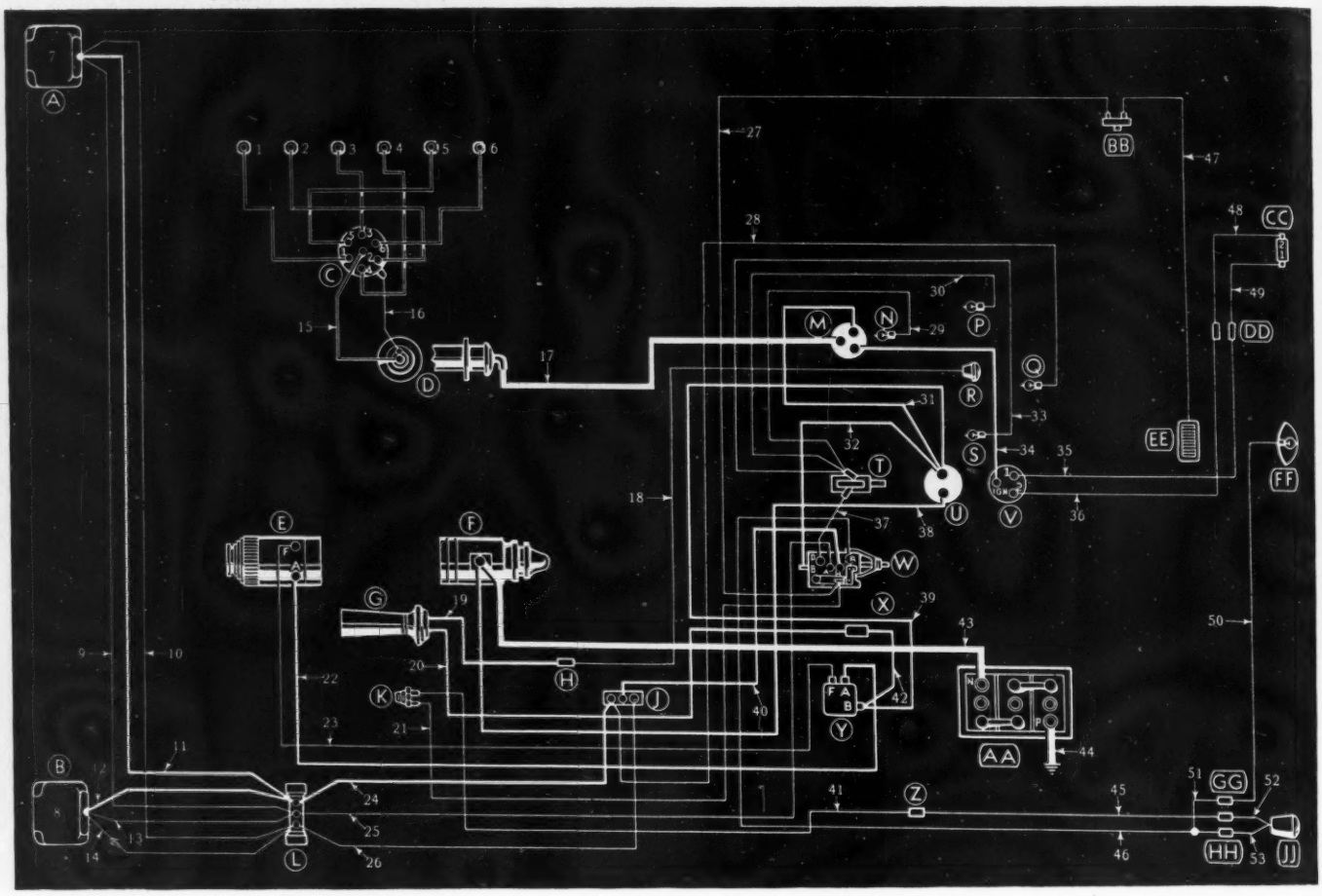
I am going to tell you how to remove this bolt in 20 minutes and this will work on '34, '35, '36 and '37 Plymouths. I have used this method on my last four or five Plymouth bearing jobs.

This bolt that we are talking about is 5/16 in. flat head stove bolt ¾ of an inch long. It extends through the front motor support and holds the

(Continued on next page)

TROUBLE?

If you are stuck with a puzzling repair job that just won't turn out right, write to BILL TOBOLDT, Editor of Motor Age. Each month we present here a few of the numerous queries received. We'll try to straighten out your problems for you. Don't cuss—write us!



Wiring Diagram 1939 Plymouth, Model P-8

(Continued from preceding page)

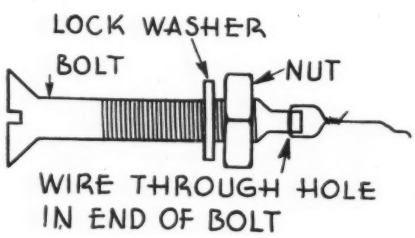
chain case cover oil seal. This oil seal is an aluminum casting held in place by two additional cap screws.

The oil seal is threaded and the bolts come through from the front. Two of them are out in the open and the other one, the flat head stove bolt, is under the timing chain cover.

Now this flat head stove bolt extends through this aluminum casting by a thread or two or is flush with the casting. In either case, it doesn't make any difference.

Take a new hack saw blade in your hands (not in a hack saw blade holder) and saw a screw driver slot into the threaded end of the bolt. Just deep enough so you can get a good grip with a screw driver. If the bolt is flush with the casting then saw a slot right in the casting too. It won't hurt anything. The oil pan and gasket will take care of that. Now turn this bolt right out toward the timing chain. The aluminum casting will come right off, allowing you to remove the front main bearing studs and bearing cap.

When the bearing cap is removed, you can reach right in below the timing chain and remove the bolt. Now take a new flat head bolt that is about ¼ to ½ in. longer than the one you removed and grind the end as shown in the drawing which I am enclosing and drill 1/16 hole through the end of bolt. Use a piece of stove pipe wire about a foot long. Put it through the hole in end of bolt and pull the bolt into the motor support from the timing chain side. Now take a 5/16 drill and remove the threads from the aluminum casting. Strip the stove pipe wire through this hole in the casting and put the casting up in



place. Then, pull the bolt up into place and fasten with nut and lock washer.

If the bolt turns, you can hold it with pliers or a small adjustable wrench on the flattened end of bolt. Now, you can cut off the end of the bolt if you like, but it won't interfere with anything even if it sticks through the nut as much as ½ in. And, that is all that there is to it. Arthur Luepton, Schultz Service Garage 350 Vermont St., Ripon, Wis.

Clutch Trouble

I have had an International C1, 1936 truck in my shop for a clutch job. We first put in a disk and had trouble in engaging the clutch. It seemed to grab and vibrate the drive shaft very badly. So, thinking the pressure plate might be uneven we tore it down again and installed a pressure plate.

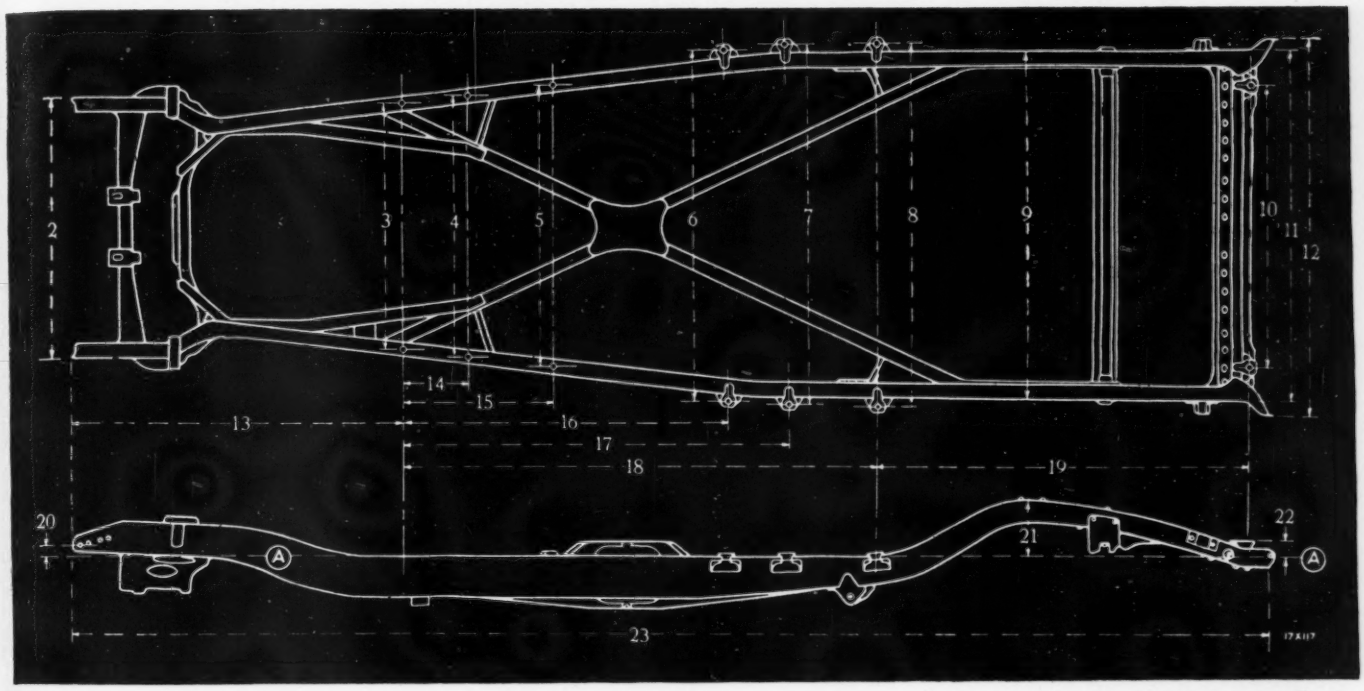
The same trouble existed. Engage the clutch and the drive shaft would shake and vibrate terrible. So, we checked the universals and found them satisfactory, we also checked the pinion adjustment in the differential and found it O. K. We also checked the motor mounts.

We have checked from all angles and are about to throw up our hands so I wonder if you could give us any light on the subject. Warren A. Hartman, 118 Holten St., Danvers, Mass.

ONE thing that might be causing the clutch trouble you are experiencing on the International C1 1936 truck is a bent clutch shaft. I suggest that you dismantle the clutch and transmission so as to get at the clutch shaft. Place the clutch shaft between centers on a lathe and check it for trueness.

Also, when you have the clutch and transmission out, I would get a dial gage and check the flywheel housing for trueness, the flywheel for true rotation, and also the bell housing. It sometimes happens that these units spring, then you have misalignment between the transmission and clutch.

I think it would pay—when bolting up the clutch housing to the flywheel housing—to be careful to pull up all the bolts evenly. In other words, after you have installed one bolt, the next one to be installed is diametri-



1939 Plymouth Frame Alignment
(Dimensions given in inches)

A—Top line of frame

2—36 3/8 (36 7/16—7 pass.)
3—33 11/16
4—36 3/32
5—39 7/8
6—49
7—50 3/8 (50 11/32—7 pass.)
8—50 7/16 (50 1/2—7 pass.)
9—48 1/4 (48 5/16—7 pass.)
10—38 7/8
11—48 1/4 (48 5/16—7 pass.)
12—51 7/8 (51 13/16—7 pass.)
13—42 11/16 (41 3/4—7 pass.)
14—12 5/16
15—24 31/32
16—47 13/16
17—56 3/32
18—65 5/16 (85 5/16—7 pass.)
19—51 5/32
20—1 11/16 (1 31/32—7 pass.)
21—8
22—2 3/32 (2 1/16—7 pass.)
23—162 1/4 (181 5/16—7 pass.)

cally opposite. Then keep going around the circumference that way pulling up each bolt a little bit at a time until they are all snug.

Low Gas Mileage

I have a 1934 Super 8 Packard, Model 1105, in the shop for carburetor adjustment. The carburetor seems to be in good condition but the owner gets only seven or eight miles to the gallon of gas.

Will you kindly advise what can be done so that he will get more mileage? A. V. Richmond, Richmond Auto Service, 7109 Exchange Ave., Chicago, Ill.

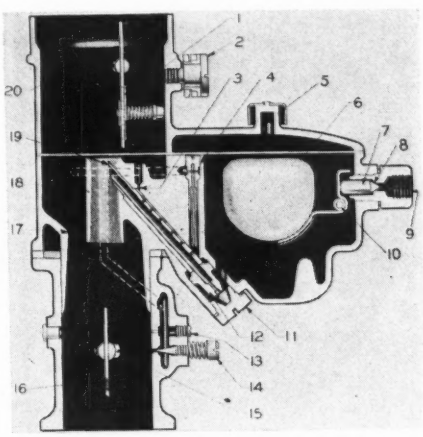
THERE are so many factors that enter into gasoline consumption that without knowing just what has been done, it is difficult to know just where to start.

In the first place, spark plugs are very important and if the ones now in the car have been in service for 10,000 miles or more, they should be replaced with new ones. The plug gap should be set at .025 inch. Breaker points should be set at .018-.022 inch. Ignition timing should be set so that the stationary points open when the 6 degree mark on the vibration damper lines up with the pointer on the timing chain cover. Movable points should open 90 deg. or 29½ flywheel teeth after the stationary points. Valve tappets should be set with a clearance of .004 inch for the intake and .006 inch for the exhaust, with the engine hot and running.

It might also be well to check valve timing to be sure that the intake valve opens 30 deg. or 10 flywheel teeth before top center.

You should check to be sure that the muffler is clear and, if there is any doubt, install a new one. Brakes should be adjusted free.

After the above work has been done, it would be well to start overhauling the carburetor. I would recommend that the main discharge jet be replaced because it is undoubtedly worn. The carburetor float level should be checked carefully and set at 5/8 inch from the edge of the float bowl to the fuel.



Cold Weather Hints

Powdered graphite applied in door and trunk locks and in door glass felt runs will reduce the tendency to freeze in cold weather. Oil tends to gum locks and spoil rubber.—*Chrysler Service Reporter.*

Two Shop Hints

Here's a couple of Shop Hints which your readers may find useful.

1—When installing molded brake lining, heat the strips on a stove or in hot water and they are pliable as an old shoe sole. They stretch out and you can put them on hot. The end rivet holes line up and you can't crack a rivet hole out, and when they get cold and shrink they are on tight as a bass drum cover. Try this yourself—I never put linings on cold any more and I don't have any gaps between the lining like I used to have. It is especially fine on the drilled lining sets.

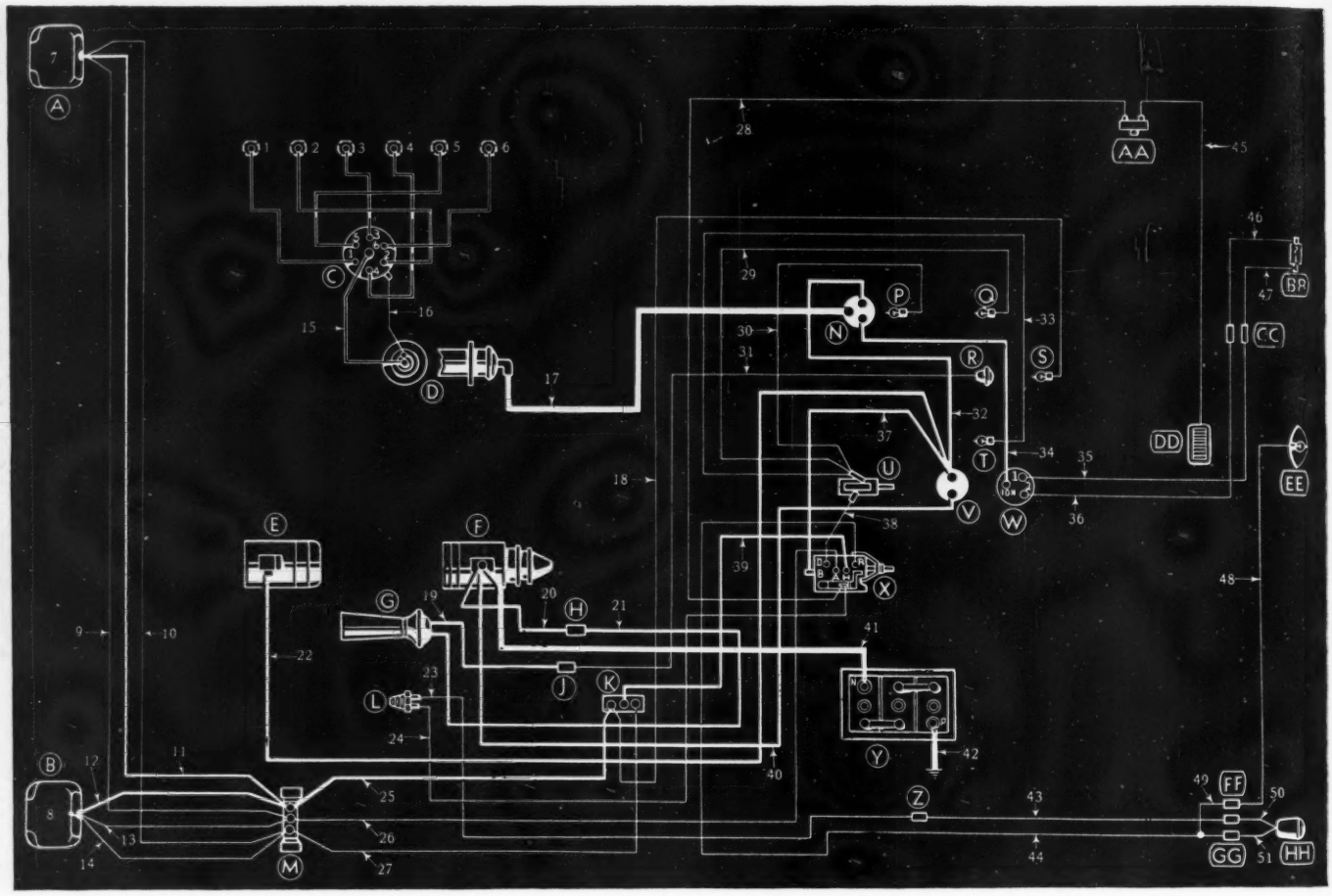
2—I see so many questions on gear shifts coming out of second or high gear while driving.

I have had dozens of these jobs come in and a couple of brand new trucks. I tried everything from all new parts down and had factory advice without results.

Then, I tried taking the plunger springs out and finding a spring that would just fit inside the present spring. In other words, double springs the same length.

I installed this set-up and have never had one come back unless the gears were worn on an angle so bad nothing would hold them in and the customer did not want to put so much out for new gears.

I have just finished a 1928 Whippet six, two 1929 Ford A trucks and a Pontiac six and have a Terraplane six coming in—all have been satisfactory. Chas. E. Roberts, Robert's Garage, Keokuk, Iowa.



Wiring Diagram 1939 Plymouth, Model P-7

Equipment, Plus

After reading your article "Gunning For Trouble With Gages," I have to agree with you on the advantages gages and instruments offer in today's modern service work. But, the best gages and instruments are no better than the man who uses them —and there are plenty who don't know how to use them—and it is problematical just how much good the average grease monkey can get out of this super-equipment, if he hasn't the technical and practical knowledge behind him.

Personally, of all the tune-up equipment now on the market, a dynamometer is really the only machine that can give you the true facts of hp. delivered at the rear wheels, which is what the customer is really interested in, but the price of such equipment is prohibitive from the standpoint of the small shop operator. And then we must consider that the average car owner of today expects a garage mechanic or dealer shops to use such equipment in diagnosing their troubles free of charge and get insulted if you make a charge for such service, so how then is the average repair man going to pay for such equipment?

The first thing that the equipment builders should do is to try and carry an educational program to the public in this respect and then we could probably afford to buy such gages, etc. However, in lieu of a tachometer, I think your speedometer and vacuum gage will do for me. L. N. Disbrow, Disbrow's Garage, P.O. Box 943, Crow's Landing, Calif.

MANY thanks for your letter of Jan. 24 commenting on the article "Gunning For Trouble With Gages." You are 100 per cent right when you say that a dynamometer is the final answer. It is also true that regardless of the equipment you may happen to have—you have to have a mighty good man operating it or he won't know what it is all about. I know that personally I have been called out on many trouble shooting jobs where the shop had all the latest equipment but the mechanic didn't know what to do about it.

It would be a great thing for the service men if the equipment builders followed their suggestions in carrying an educational program to the public. However, I don't think there is much chance of them doing it, so the shop operators will just have to struggle along as they have in the past.

Here's the Answer

I have a 1928 Durant, four cylinder engine and wish you would please tell me the maximum brake hp. at specified r.p.m.

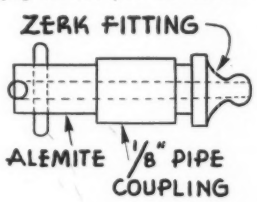
I have tried several places but have been unable to get this information. Raymond Robinson, DeValle Bluff, Arkansas.

IN 1928, Durant did not build a four cylinder car. They built three sixes. One a 2¾ x 4¾ which developed 40 hp. at 2400, the second a 2⅞ x 4¾ which developed 47 hp. at 2800, and the third a 3⅜ x 4⅝ which developed 70 hp. at 3000 r.p.m.

The Star, four cylinder job which was built by Durant in 1928, is probably the job to which you refer. This had a Continental Model W-5 engine with a 3⅜ bore x 4¼ stroke and developed 36 hp. at 2400 r.p.m. The compression ratio was 4.2 to 1.

Greasing Tool

This is a sketch of a simple tool for greasing spring covers on the late model cars. The only operation necessary to make it is to remove the ball check out of the Zerk fitting. The coupling can be bought at any plumbing supply house for 10 cents.



This is one of my handiest little tools. It may also be used for greasing tie rods on Terraplane cars. Michael A. Ferraro, Yonkers, N. Y.

Windcharger Trouble

I have made a windcharger, using a Chevrolet generator. The propeller seems to turn fast enough but the generator does not charge although I am sure it is in good condition. I wonder if you could tell me what is wrong and if any special equipment is needed? H. Vasquez, O.S.T. Garage & Service Station, Balmorhea, Texas.

MY first thought is that the propeller you made for your windcharger is turning the generator in the wrong direction. It will have to turn in the same direction as it would in the car—in other words, looking at the pulley end of the generator, the armature must turn in a clockwise direction.

If it has been turning in the wrong direction, the residual magnetism has been drawn out of the generator and your first job is to recharge it. This can be done by disconnecting the field wire from the third brush and connecting it to the positive terminal of a battery. A wire from the negative post of the battery should be touched to the frame of the generator—just touch it, and then take it away. Reconnect the field wire to the third brush.

If you can't make the propeller turn the generator armature in the right direction, then you will have to reverse the field wires in the generator. To reverse the wiring, take the field wire which is now grounded and run it over so you can connect it to the third brush. Disconnect the field wire that is attached to the third brush, and ground it. This will allow the generator to charge even though it is turning in the wrong direction.

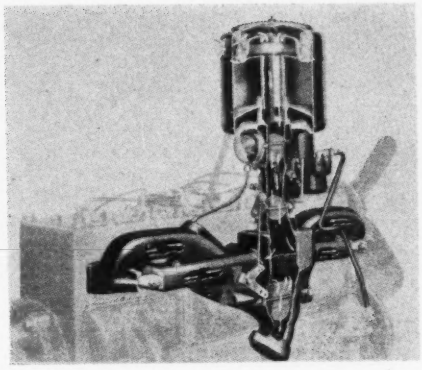
Wanted: More Speed

Please give me some advice on a 1936 Oldsmobile Six that just won't rev up. After grinding valves, installing pump, cleaning carburetor, gas lines, checking ignition timing, testing coil, condenser, plugs and installing new points, this car still won't go faster than 68 m.p.h.

This car, he tells me, has had valves ground four times in 41,000 miles. It had new rings installed at 31,000 miles, and the cylinder walls are slightly scratched. This is my first work on this car and would like to step it up if I could. I set valves a loose .008 and .010. It has good power, runs smooth, idles perfect.

I am going to check valve timing, automatic choke and try a set of new plugs although it has a new set of plugs in it. I cleaned and set them .003 gap. Please give me what advice you can. Roy T. Cross, McConnell, Ill.

THE work you have performed should put the engine in pretty good shape with the exception, of course, of the condition of the pistons, rings and cylinder walls which you mention. However, I think it may



be possible for you to step up the top speed a little by doing three things.

First, be sure that the breaker points are set at .020 inch gap. Second, check the heat control valve in the exhaust manifold to be sure that it is free and that it opens when the engine is warm. Sometimes this valve shaft becomes stuck and keeps the valve closed so that the exhaust gas sets up a back pressure. The next point is to install a new muffler and, at the same time, be sure that the muffler tail pipe is not dented but is perfectly round throughout its entire distance.

In tuning up this engine, I suggest that you follow the procedure recommended by Motor Age some time ago.

Jack up the rear wheels and put the car in high gear. Start up the engine and remove three spark plug wires and then speed up the engine to about 35 m.p.h. Then start shifting the distributor while someone watches the speedometer and lock the distributor at the point which will give maximum miles per hour. This method of setting ignition timing has been tried quite successfully by several of our readers since the story was published and they all report that it improves road performance considerably.

Rear Main Bearing Leak

I read your magazine every month and get a lot of help from your service men's queries or repair troubles.

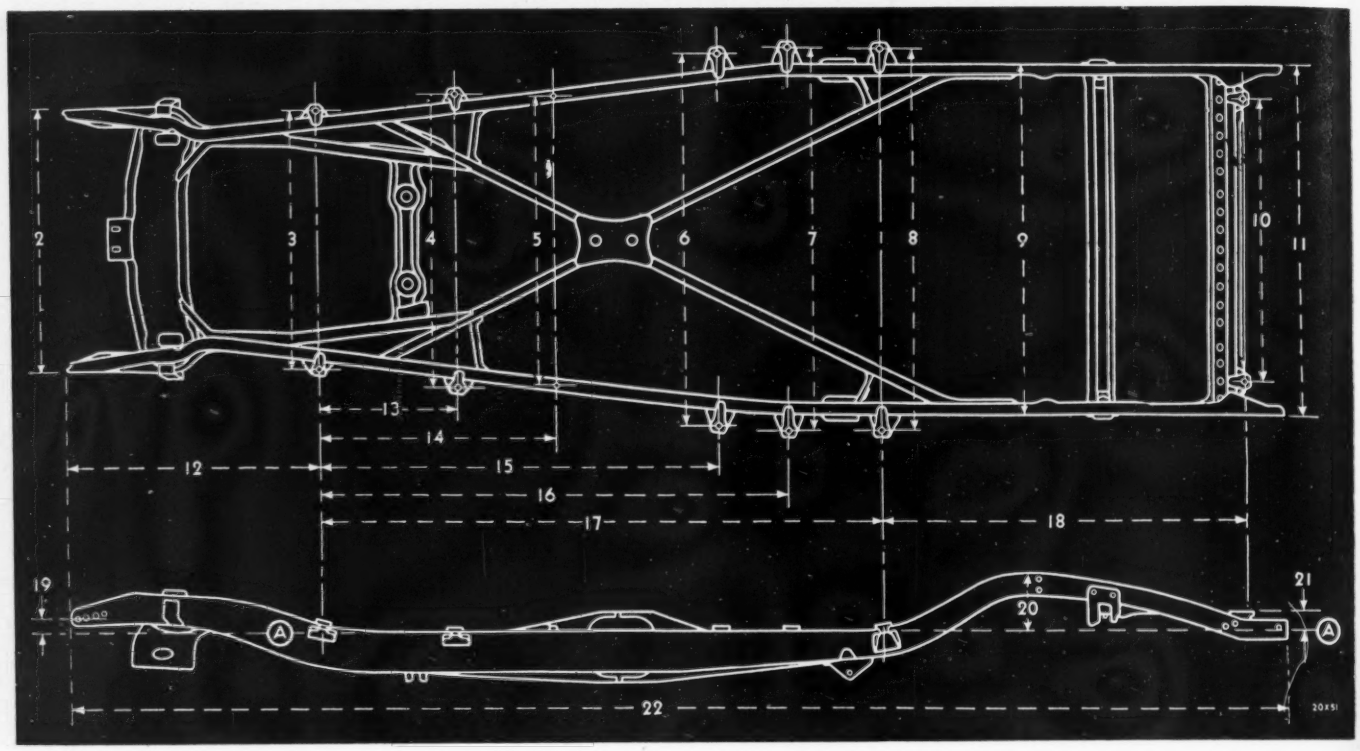
Now I have one that I would like to have answered. I have a Ford Model A motor that leaks oil around rear main bearing. This oil leaks out over the bearing and comes down into the flywheel housing. This motor has been factory rebuilt, rebored and new main bearings.

The motor was in another shop before I had it come in to me and now I have done everything that I knew or ever heard of to do. I first discovered that the half oil ring had been left out of the block. I put this in and thought my troubles were over but about a week later it came back with the same trouble. I proceeded to tighten up the bearings, drilled cap and groved it to this hole, took oil drain pipe off (this bearing had large pipe), plugged up hole from valve chamber to the camshaft bearing, took bearing off and filled rear end to make it tighter and then put a thin coating of sealing compound on the bearing so oil does not leak through the side of the bearing. Took motor out and put new gasket between motor and flywheel housing. Put new breather pipe and cap on. It will use a quart of oil every fifty miles. Charles E. Hunter, Salineville, Ohio.

JUDGING from your description, I am inclined to the opinion that you have a condition that is going to be very difficult to stop. Your letter states that oil leaks out over the rear bearing—which means to me that the oil is leaking out of the upper half of the bearing. If this is the case, there is nothing you can do to stop it and the motor will have to have a new bearing poured and then line-reamed before this condition can be corrected. If, on the other hand, the oil is leaking out of the sides of the bearing, it might be

(*Continued on next page*)

"I hadda take this apart so much I put in a zipper!"



1939 De Soto Frame Specifications

A—Top line of frame
2—36 3/8 (36 7/16—7 pass.)
3—35 7/8 (35 31/32—7 pass.)
4—40 1/2 (40 13/32—7 pass.)
5—40
6—51 5/32 (50 7/16—7 pass.)
7—52 5/16
8—52 5/16 (52 5/8—7 pass.)
9—48 1/4 (48 5/16—7 pass.)
10—38 7/8
11—48 1/4 (48 5/16—7 pass.)
12—36 1/4 (36 5/32—7 pass.)
13—19 5/32
14—32 25/32
15—54 31/32 (63 13/32—7 pass.)
16—64 1/32
17—77 1/32 (94 13/32—7 pass.)
18—49 25/32
19—1 1/16 (1 3/32—7 pass.)
20—8
21—2 5/32 (2 1/16—7 pass.)
22—169 1/32 (186 1/16—7 pass.)

(Continued from preceding page)

that a new bearing cap, with a new oil seal, would do the trick. I am very much afraid, however, that you have a job here that is going to require factory attention to that rear main bearing before you will be able to get a leak-proof bearing.

Which Is Which?

Would you kindly give me the following information regarding brakes? Would like to know how I can determine the primary brake shoe pull-back spring from the secondary spring.

Also, if there is a set rule to determine the primary shoe from the secondary shoe on two and three piece brakes in relation from the brake cam. Wm. G. Benz, 52 Prescott St., Jersey City, N. J.

THE difference between the primary brake shoe pull-back spring and the secondary shoe pull-back spring is that the primary shoe spring is the weaker of the two. The strongest spring goes to the secondary shoe.

The primary shoe is the shoe which contacts the drum first when the brakes are applied and the car is going forward. This is always the case whether the shoe set-up is a two or three shoe design. If you will pull off a wheel and have someone apply the brake, you will notice that one shoe contacts the drum slightly before the other and, therefore, imparts to the secondary shoe the energizing action developed by the wheel rotation. If you will just keep in mind that primary means "first" and remember that the primary shoe is the first to go into operation, you will be able to keep this point straight in your mind.

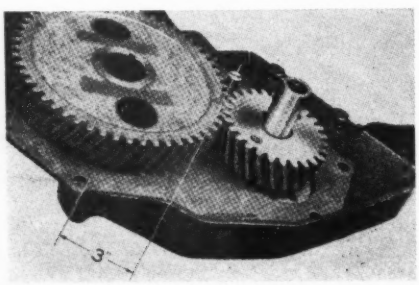
Oil Leak

I have a 1933 Chevrolet which is throwing oil out the front end. It comes out between the timing gear case cover and the fan drive pulley. There is an open space between the hub on the drive pulley and the case cover of about 1/8 in. Should that be that way? The oil slinger is faced to the front. The breather pipe has been cleaned and new gasket installed.

I have taken this car down twice without any results.

Would appreciate any suggestions you can give. J. E. Armbruster, 17 Raymond Ave., Shelby, Ohio.

ON your 1933 Chevrolet that is throwing oil out the front end, these are two things that I suggest you check. First of all, make sure that the crankshaft endplay is not in excess of .005 inch for, if such is the case, the oil slinger would become ineffective.



I would also suggest that you check the oil jet that supplies oil to the timing gears for, if this has worked loose or has been removed entirely, so much oil will be supplied to the timing gears that the drain cannot take care of it.

I cannot see that the open space between the hub and the case cover, as you mentioned in your letter, would letter, would have any bearing on your problem. However, I would suggest that when you take the job down that you install a complete new oil slinger as the old one may have become bent.

Needs a New Gasket

Do you know of a cure for an oil leak from the timing chain to the water pump on a 1930 LaSalle? Myers Garage, 4928 West Adams, Los Angeles, Calif.

THE water pump is mounted to a plate which is attached to the timing chain compartment and also to the generator so that the generator moves with the water pump to take up the fan belt tension. The leak probably occurs between the plate and the timing chain compartment.

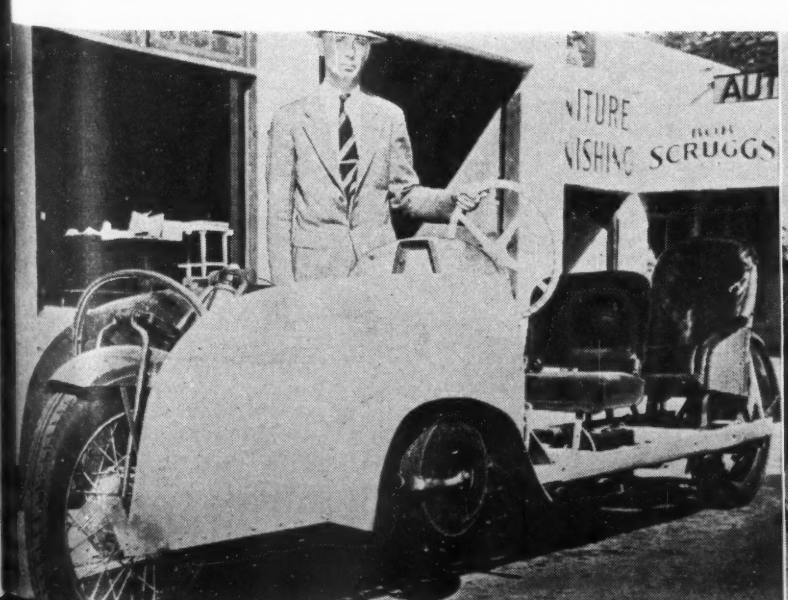
If you will loosen the water pump assembly and drop it down, it is possible to install a new gasket between the water pump mounting plate and the timing chain cover. I feel quite sure this will correct your trouble.

(Above) Stunt rider George Dockstader in the first annual Motion Picture Stunt Revue, held recently at Gilmore Stadium, Los Angeles. He is shown here making the daring young man on the flying trapeze look like a softy by displaying his flying motorcycle trick for the wide-eyed spectators. Immediately after this picture of Dockstader jumping over eight barrels on his cycle was taken, the stunter was injured.

(Left) "Wild Bill" Cummings, Indianapolis winner and well-known race driver was fatally injured when his car left the highway near Indianapolis, plunged through the guard rail shown in the upper picture and overturned in the creek below. Lower photo is the car Cummings was driving. He was pulled from it, unconscious, by a passing motorist.

(Lower Left) Retractable landing wheels, until now an exclusive feature of the airplane, appear on this invention of J. G. Tingle of Miami. The two-wheeled car, according to its inventor, combines the features of the motorcycle so far as traction is concerned, and the thrills of airplane riding because of the easy sway. He claims it is easy to drive.

(Lower Right) Jesse Willard, former heavyweight champion of the world is shown as he served as official starter for a race between two horseless carriages in Miami. Dr. George Young of Minneapolis is the owner of the 1886 "Hot Shot." Bill Pierce, shop owner of Belleglade, Fla., owns the 1900 "Bullet." The Belleglade Bullet won at 18 m.p.h.



(Above left) In the event of a blockade during war, Japan would be cut off from her oil supplies. Hence Japanese interest in charcoal burning automobiles. An exhibition of these cars was held recently in Tokyo, where the various types of charcoal cars were inspected by experts of the Commercial and Industry Ministry. The charcoal burning apparatus is carried in the luggage compartment.

(Above right) A new state car, a Daimler straight eight, has been placed at the disposal of the British Royal family. A glass-panelled roof has been installed in the rear compartment so that the King and Queen will get more light and will be able to be seen more clearly on state drives in bad weather. Special raised cushions have been fitted for the two princesses on the folding seats.

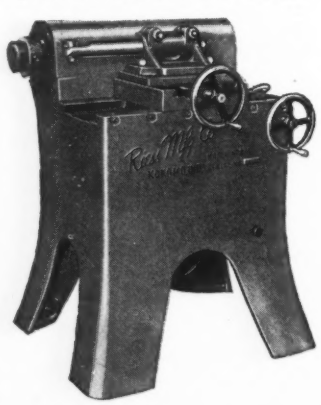
Metropolitan Automotive Maintenance Show

The dates previously selected for the New York Metropolitan Automotive Maintenance Show have been changed to April 10-11-12-13. This change to one week later than the original dates will be of decided advantage to those manufacturers and guests from out of town who wish to visit the opening of the New York World's Fair.

The 1939 show, which is the third annual affair, promises to be even larger than its predecessors according to Walter V. Hall, Show Manager. Contracts for over one half the space have already been received from leading manufacturers and local wholesalers all of whom have been in previous shows.

Riess Brake Drum Lathe

Whether you prefer truing brake drums by the lathe principle or by grinding, the new Reiss Model 8M brake drum lathe will meet your requirements. Soft drums can be turned through the lathe principle while drums of high carbon content or drums containing hard spots can be quickly given a glass-like finish with



the grinder. Will handle flywheels as well. The main spindle is hollow to accommodate Chevrolet and Pontiac drum and axle assemblies, as well as those of trucks made integral. Price $395.00. The lathe is made by the Reiss Mfg. Co., Kokomo, Ind.

Bargain Sales End Pierce-Arrow History

Liquidation proceedings write "finis" to one-time leader in auto world

The last chapter of the history of the once great Pierce-Arrow Motor Corp. is being written down with a five-and-ten-cent sale in the quiet of the huge plant once alive with men at work.

Geometric dies, drills, gauges, once valued in the millions, now are racked on what resembles a notions counter.

Inked pots and the pens that signed million-dollar checks, desk chairs once occupied by men like Col. Charles Clifton and John C. Jay, filing cabinets that held orders from every part of the world, all voiceless witnesses to the passing of a great company, stand marked at bargain prices.

Pierce-Arrow is being sold piecemeal. Its 12 buildings, 44-acre plant which housed more than 10,000 employes with a payroll that in 1918 topped $15,000,000, now is being liquidated by the 1695 Elmwood Ave. Corp., formed by the Marine Trust Co. and Federal Reserve Bank to buy in the property and equipment at the bankruptcy sale.

Bulk of the purchases is being made by former employes who come in to reminisce about the days when Pierce Arrow was humming with thousands of orders, custom-built cars for Fatty Arbuckle, Clara Kimball Young, Warner Baxter—and the usual order from the White House for the President.

They still talk about the deluxe custom-built Pierce for the Shah of Persia. Its fittings mounted with gems, solid gold trimming on the dashboard, the Shah's crest prominently displayed on the tonneau, the car was a three-day wonder on the showroom floor.

Three men were responsible for the growth of Pierce-Arrow from a small bird cage and bicycle manufacturing plant to the top of a business destined to be the nation's greatest industry. Col. Clifton, the salesman extraordinary, George K. Birge, the financial wizard, and Henry May, the production expert, combined their skills to bring about an organization of mechanical genius and business acumen probably never since equalled in Buffalo.

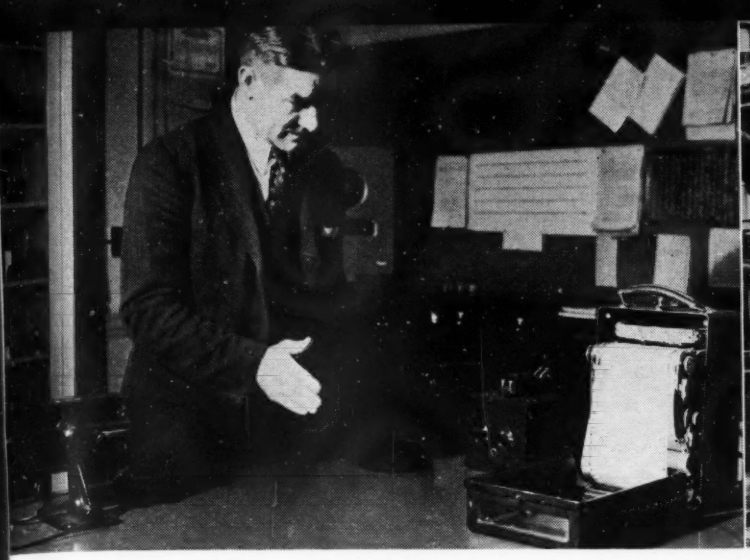
But in 1916, when the company's annual income was exceeding $5,000,000 and the Allies were buying Pierce trucks as fast as they could be produced, Birge felt that the company was too closely held.

He sent to New York for a banking house to handle a transaction of $16,000,000, exchange the old stock for new, recapitalize the company and list Pierce-Arrow on the New York Stock Exchange. Birge stepped out of the picture then, selling his 7000 shares at his asked price of $1,000 a share.

Henry May was the next to go. When Goethals & Co., industrial engineers, took over operation of the company and put into effect a management system that May felt unfair to his men, he resigned and left a gap never to be filled.

Martin C. Ewald, with the company more than 30 years, heads the liquidating firm. Tom O'Rourke, for a quarter of a century manager of sales to all parts of the world, supervises the sale of machinery and equipment.

John P. Cullen, another veteran, once the paymaster of the plant's 10,000 workers, makes out receipts for nickel and dime sales.



(Above left) Thomas S. McCaleb of the Harvard University Institute of Georgraphical Exploration is shown with his electric eye device which operates as a "robot policeman" to check illegal traffic speeds. McCaleb claims that the exact speed of any object breaking the light beam can be indicated on an attached scale. The device might also be used to warn motorists of traffic approaching corners.

(Above right) When the owners of a service station at Guthrie, Okla., found their station being picketed by a labor union, they installed an amplifier and broadcast swing music for the marching pickets, and posted a sign calling attention to their "walkathon." Their action attracted attention—and customers. They say they hope the picketing continues indefinitely, for it's meant more business.

Stock Racing Returns to Daytona Beach

First competition since Milt Marion set 52 m.p.h. average in 1936

Stock car racing was scheduled to return to Daytona Beach, Florida, on March 19 in a 150-mile event sponsored by the Daytona Beach Racing Association in cooperation with the resort's Junior Chamber of Commerce.

It will be the first automobile competition since 1936 at the former site of the world land speed trials. A 250-mile classic run March 8, 1936, was won by Milt Marion, of St. Albans, N. Y., at an average of 52.21 m.p.h., driving a Ford V-8. The pace that day was slower than anticipated because the course broke up and the final stages were raced under extreme difficulty.

This month's event was scheduled over that same 3.2 mile course. The field was to follow the same route down the wide beach and return over the highway adjoining.

Competition is open to any type of stock car. The only restriction placed on alterations prohibits the addition of superchargers and use of overhead valves. Fenders and windshields must remain on the cars and bumpers and mufflers must be removed. As a safety measure, doors must be anchored shut. While no limit was placed on the oil or gasoline a car could use, no reserve oil, gas or water tanks were to be allowed on the cars.

The guaranteed purse of $890 includes $50 to apply to lap prizes. The ten places in the prize distribution are: 1st, $300; 2nd, $200; 3rd, $100; 4th, $75; 5th, $50; 6th, $35; 7th, $25; 8th, $20; 9th, $20; 10th, $15.

Qualifying trials to select the thirty fastest cars will be held March 17 and 18 at 10 A. M. The race will start at 12.30 noon. No deadline has been placed on the date on which entries must be filed. The driver meeting, at which time credentials will be distributed, was set for March 18 at 8 P. M.

Charles J. Reese, Jr., is president of the racing association.

United Motors Meetings

Sales executives of United Motors Service and service engineers of the Delco Brake division of General Motors are holding meetings at all United Motors Service branches. The meetings started at the Detroit branch Feb. 25 and will continue through April 16.

These meetings are to introduce to the trade the 1939 merchandising program on Delco Brakes and will feature a brake service clinic. The Delco "Super 9" hydraulic brake fluid, and rubber growth demonstrations, will play an important part in these clinics. United Motors Service acts as the national field sales and service organization for the Delco Brake division.

H. B. Smith, merchandising manager of Delco Brakes for United Motors Service, assisted by Frank Plovick and Robert Curry, will conduct the meetings. H. B. Nichols and F. J. Markey of the Delco Brake division will take part in the clinics.

Wonder-Weld Appoints Reeves

Burt Reeves has been appointed New England representative by the Miller Manufacturing Co., makers of Wonder-Weld.

Date Set for 1939 Automobile Show

The Show Committee of the Automobile Manufacturers Association announced on Tuesday that the 40th annual National Automobile Show will open at Grand Central Palace, New York, Oct. 15, with local dealer shows to open a week or, in some instances, two weeks later.

The date selected is three weeks earlier than last year, in order to meet the annual model announcements, and furnishes dealers with a longer fall selling period for used cars as well as for the new offerings in cars and trucks, it was stated.

A major consideration in the selection of this date, the A. M. A. said, was the contribution it will make for the stabilization of employment in both the automobile industry and its network of supplying industries. The employment necessary to manufacture dealer stocks and to satisfy new model customer demand thus is created in what would otherwise be the period of slack demand in the fall and early winter.

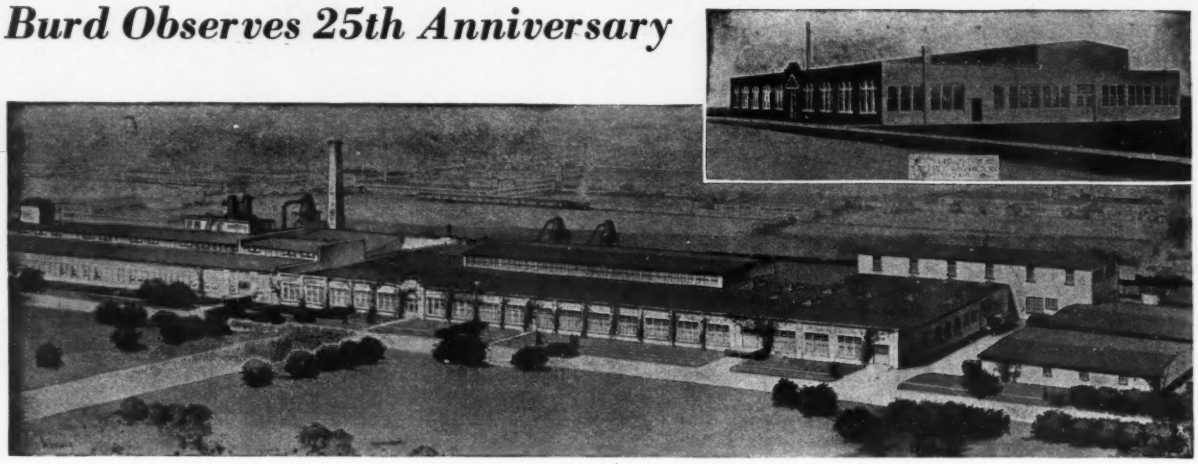
Byron C. Foy, chairman, Richard H. Grant and Paul G. Hoffman of the show committee, announce that the plans for this 40th anniversary affair will completely change the interior of the Palace along with the kind and character of exhibits.

There will be an exhibit of antique cars with suitable prizes for age, condition and past records, and an entire floor of 35,000 square feet for the only exhibit of delivery wagons and motor trucks that will be held in New York this year.

New Radiator Hose

Thermoid's new improved radiator hose can take it, even though the engine mountings permit greater flexing of the engine. Made of higher quality rubber, red, extra heavy in thickness, with fabric reinforcement bias cut to provide greater elasticity without separation between the tube and the plies. Tube so compounded that operating temperatures do not further cure the rubber, making it more rigid. Six 3-ft. lengths of hose are packed in a corrugated carton.

Burd Observes 25th Anniversary



Expanding for 25 years—The Burd Piston Ring Co's first plant (smaller photo) and a view of its present vast plant.

This year the Burd Piston Ring Co. of Rockford, Ill., celebrates its twenty-fifth anniversary. Way back in 1912, R. L. Burd of Rockford, was interested in improving the performance of motors. Even prior to 1914, when the Burd High Compression Ring Co. was incorporated, he had developed and had manufactured a piston ring. Mr. Burd had been working in the service department of the Burroughs Adding Machine Co. and naturally was mechanically inclined. Without a manufacturing plant, but working with expert Swedish mechanics trained in the old country, he had a piston ring made for him in a small plant then located in what is known as the "Water Power" manufacturing district of Rockford. Many of the earlier mechanics who were interested in his development still recall his enthusiasm for improving the performance of motors due to the addition of better piston rings.

In the early days of the piston ring industry, rings were made sometimes by sawing off a piece of gas pipe, or by casting a sleeve and cutting off rings of the proper dimensions, without regard either to the uniformity of the iron or to the tension, flatness and light-free characteristics so essential in the piston rings of today. Besides embodying a degree of precision and advanced metallurgy then new, the first Burd rings were of the "coupler type," having a segment dovetailed across the gap so as to maintain continuous wall contact and also avoid any appreciable opening to the space behind the ring.

Imagine a piston ring company selling rings at what now seems to be the exorbitant price of $1.50. Yet this was the established price that obtained until 1919 when the price was reduced to $1.25 and in 1922 to $1.00.

An early issue of *Burd Ring Wisdom*, the company's house organ, stated: "We have records showing that a truck, for example, of 3000 lb. capacity would use one quart of oil to 12.4 miles prior to the installation of Burd piston rings, and after their installation reports show mileages to 22.4 miles per quart." Still another report reads that: "A Ford roadster used a quart of oil in 62 miles but after the installation of Burd piston rings the mileage was increased to 113 miles per quart of oil." Such figures as these would be considered extremely extravagant in the use of oil in the present day, when we expect a car to run at least 1000 to 1200 miles on a quart of oil.

On January 1, 1916, the Burd factory was completed and ready for occupancy.

Soon after completion of the factory, the capital of the company was increased, from $50,000 to $200,000. Hardly was the factory completed before additions were started and others have been made almost annually from that time to this. In 1921 an increase in capitalization was made to $325,000; in 1929 to $500,000.

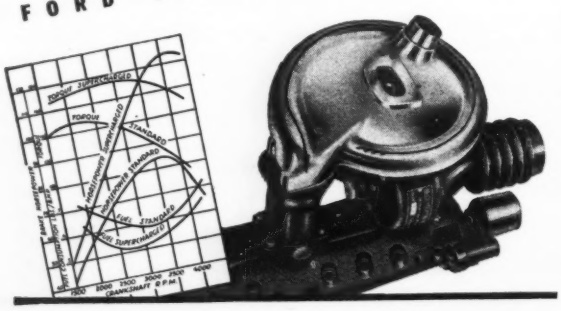
One of the early milestones hurdled by the Burd Piston Ring Co. was its establishment of a foundry. This was done in 1917, for it was soon found that in order to be a real manufacturer of piston rings, the company must have control of its products in every phase of its manufacture. In the beginning, castings were secured from an independent foundry, but they were found to be unsuitable for the type of piston rings that Burd wanted to manufacture, so an independent corporation was founded, known as the Liberty Foundries Co., which stock was afterwards purchased and today is a wholly-owned subsidiary of the Burd Piston Ring Co.

The current history of the Burd Piston Ring Co. is generally known. Its present officers have been with the company for the past twelve years. A. A. Lundgren, vice-president, became secretary in 1924. M. E. Wahlstrom, the present secretary, was added to the board of directors in 1929. F. M. White, president, came to the company in 1926 and was made president early in 1927.

GOT A PUZZLER ?

Don't just scratch your head, scratch your problem on a piece of paper and send it to Reader's Clearing House. Let us help you find the answer.

FORD V-8
MERCURY
FORD TRUCKS



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SELLING *McCulloch Superchargers*

TO YOUR FORD V-8 CUSTOMERS

The swing is to supercharging! And that means unlimited profits for every McCulloch dealer! Here's why: The McCulloch Supercharger for Ford V-8 cars and trucks and Mercury cars steps up power, increases torque, assures substantial gas savings, quiet, smoother performance, livelier handling and longer engine life. Easily installed. No wonder prospects buy eagerly! Act now to cash in on nation-wide advertising.

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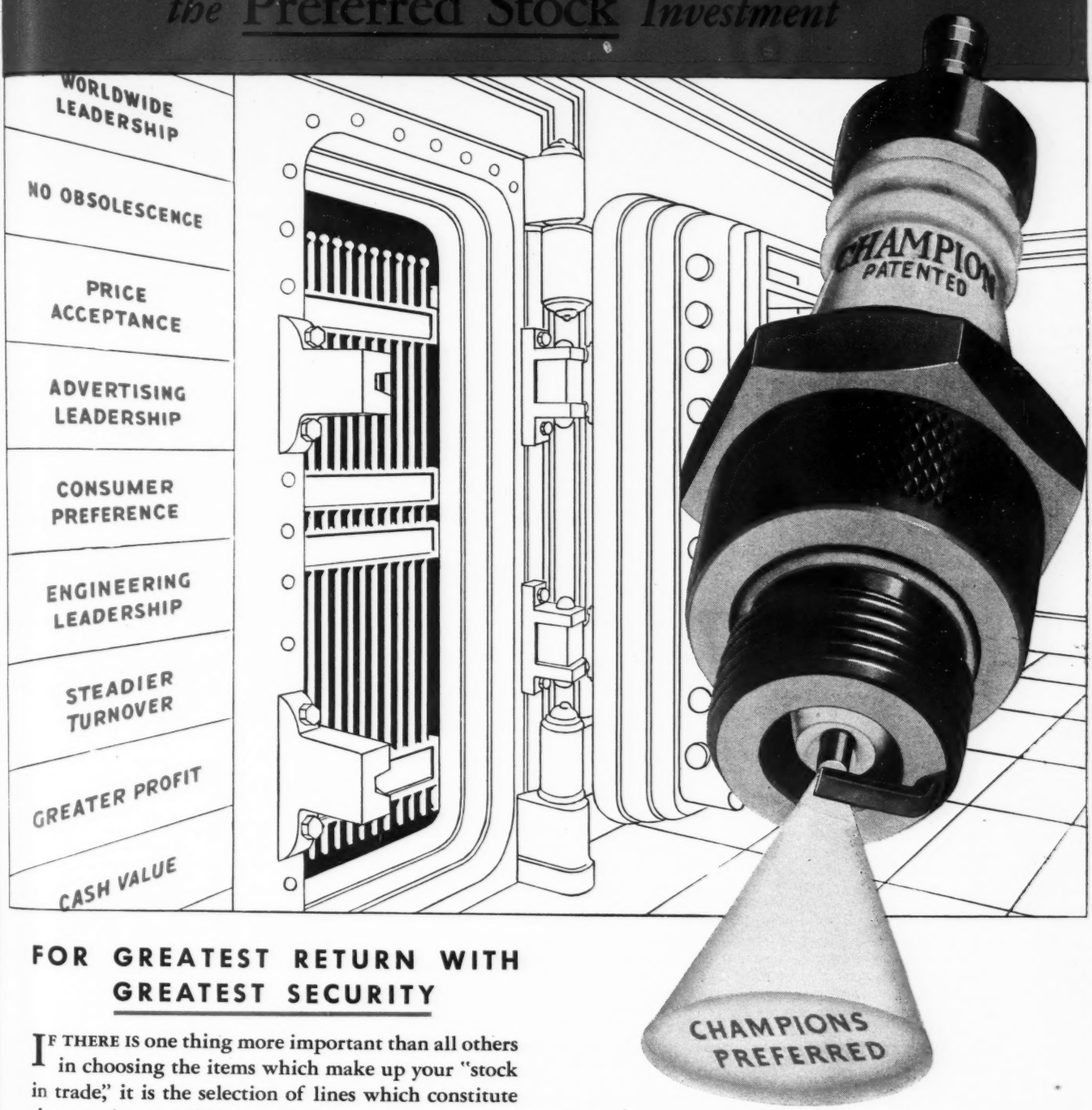
Choose Champion Spark Plugs

the Preferred Stock *Investment*



FOR GREATEST RETURN WITH GREATEST SECURITY

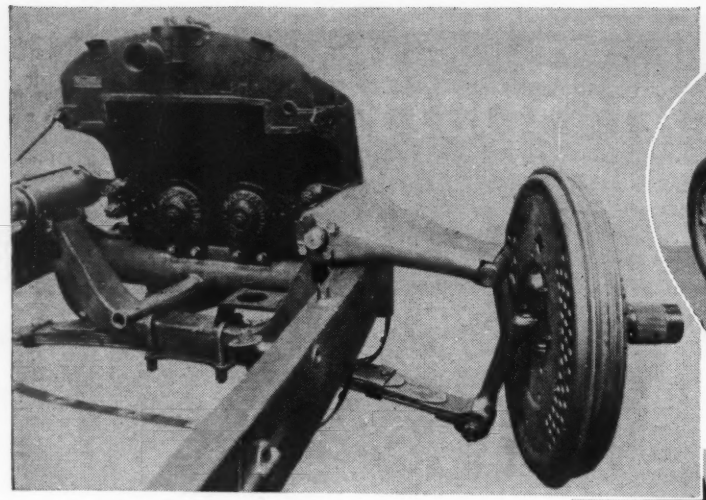
IF THERE IS one thing more important than all others in choosing the items which make up your "stock in trade," it is the selection of lines which constitute the soundest possible investment.

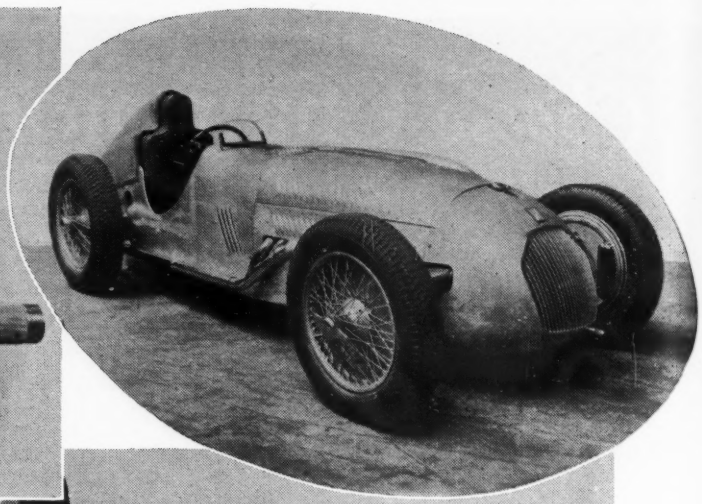
Champion Spark Plugs qualify by every security standard as the *preferred stock* investment. They give you unequaled turnover because they are the preferred spark plugs. They give you steady income because they are the preferred spark plugs. They give you sound security, having absolute cash value, because they are the preferred spark plugs.

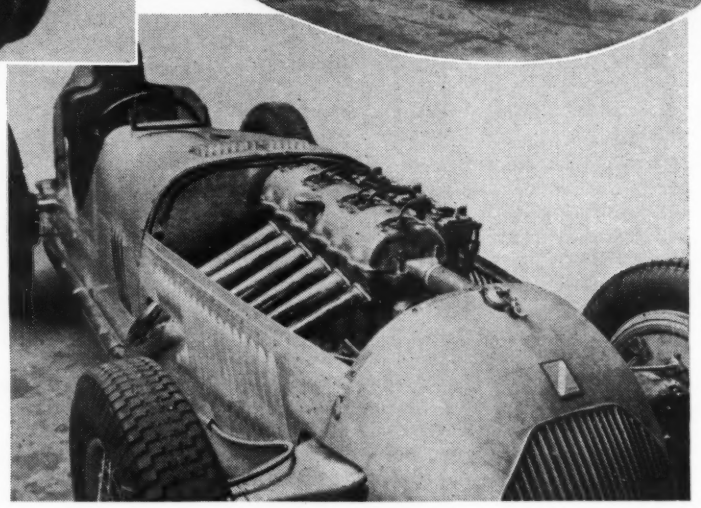
Champion's new Sillment seal—which permanently seals them against troublesome leakage common to ordinary spark plugs—brings another outstanding value to the many exclusive and patented features which have made Champions the preferred spark plugs—a demonstrable, merchandisable feature that is *creating* sales for Champion dealers everywhere.

Get on a sound basis by choosing Champions, the *preferred stock* investment, with greatest return and greatest security.

IT'S THRIFTY TO STOCK AND SELL CHAMPIONS







Three views of the Talbot Darracq government subsidized racing car. Above is a close-up of the front independent suspension. The car shown in the oval and at the right is powered with a six-cylinder non-supercharged engine and is intended for use on hilly, winding tracks. Another model has a supercharged 16-cylinder engine, will be used for fast road courses.

France Sets Up Race Team For International Meets

This year, for the first time, France will line up against Germany and Italy in international racing with a subsidized team of cars. The $14,000 received by Talbot Darracq from the national racing fund has enabled the French firm to complete a set of five cars.

One type of chassis and two types of engines have been produced, one being a 6-cylinder non-supercharged powerplant of 4½ liters displacement (274.5 cu. in.) and the other a 16-cylinder supercharged model of 3 liters displacement (183 cu. in.). The cars have to run under the common minimum weight of 1873 lb.

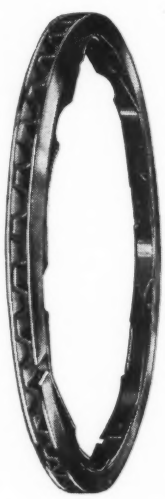
A conventional box section chassis is used, with a transverse spring in front mounted inside a channel section cross-frame member. Connection from the steering head to the chassis is by an oval-section wishbone, mounted at its inner end on the hydraulic shock absorber shaft. Each hydraulic shock absorber is supplemented by a friction-type shock absorber carried crosswise on a big-diameter tubular frame member just behind the radiator. The wishbone is designed to take all the brake reaction The engine is mounted at the rear to a banjo cross-frame member and at the front rests on two brackets with rubber blocks. A Wilson preselective transmission is used and final drive is by open shaft inside a chassis tunnel. Only the front wheels are sprung independently, the rear having a pair of semi-elliptic springs. The tank is an aviation product weighing 26 lb. and has a capacity of 52 gal. Brakes are Bendix mechanical, with aluminum alloy drums having liners. The backing plate has an air scoop in front and an air release at the rear.

The non-supercharged engine has its six cylinders in an aluminum alloy casting, with nitralloy pressed in liners, an alluminum alloy head with bronze valve seats, two inclined valves operated by pushrods, and plain bearings throughout. Three downdraft carburetors are used. Ignition is by a Bosch magneto and as the chassis does not scale up to the minimum of 1873 lb., an electric starter and battery are fitted. Lubrication is by dry sump, with an aviation type oil radiator mounted behind the fireproof dash and having its fins just emerging through the cowl. This engine weighs 352 lb. for an output in excess of 250 hp.

The supercharged engine is of a different type. The 16 cylinders are in two blocks of 8 and the two castings made of aluminum alloy, with bronze heads cast in with the alloy. The cylinder barrels are nitralloy forgings, each one being bolted to its bronze head by means of four bolts. Roller bearings are used for both the crankshaft and the connecting rods. There is a separate displacement type blower for each bank of cylinders.

A feature of this engine is the use of a single overhead camshaft for each bank of cylinders, the exhaust valves being operated direct from the cams and the inlet valves through a short rocker. Ignition is by magneto. A starter is carried, but no batteries, current being obtained from the pits. Lubrication is dry sump type, as on the non-supercharged engine. The 3-liter engine, which is now on its bench tests, develops its maximum power at 7000 r.p.m.

For the Tough Jobs



Use too much oil? Then install the new "Oil-Savr" ring introduced by Wausau Motor Parts Co., Wausau, Wis. It's a new-type steel segment ring with a special-alloy spacer combined with an inner ring. Spacer is flexible, with unusually large vents for by-passing oil, and exerts a rotary wiping action on the wall. "Oil-Savr" rings are available in all sizes for passenger car, truck, bus, tractor, marine and aviation installations, and in matched unit sets. Write the manufacturer for complete information and for free sample ring.

Thor Drillmaster

For a light-duty drill, designed for intermittent service in maintenance or installation work, the new Thor Drillmaster, a ¼-in. electric drill priced at $19.95, is recommended by the Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill. Weighs 4 lb., and is 12 in. in overall length; universal motor available for 110 or 220 volts, with free speed of 2000 r.p.m.; equipped with ¼-in., 3-jaw Jacobs chuck, grip handle with recessed thumb-control switch.

Presenting some of the New **LINCOLN LUBRICATING EQUIPMENT for 1939**

CHASSIS LUBRICANT DISPENSER—Model 4338 Portable Air-operated Single Cylinder Lubrigun is for high pressure chassis lubrication.

LINCOLN **The Key to** *Better*

LUBRICATION SERVICE

for the car owner--and

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GEAR LUBRICANT DISPENSER—Model 4408 Portable Air-operated Gear Lubricant Dispenser. Includes sleeve with "Gear Lubricant" title plate, base with casters, Lincoln Junior Meter, 5-ft. volume hose, shut-off valve with non-drip nozzle and Flex-O-Matic Air Coupler.

GEAR LUBRICANT DISPENSER—Model 4533 Hand-operated Portable Gear Lubricant Dispenser includes sleeve with "Gear Lubricant" title plate, base with casters, Lincoln Junior Meter, 5 ft. hose with non-drip nozzle.

DRAINMOBILE—Model 4601 is designed for portable service in draining crankcases, transmissions and differentials. Accommodates any 100-lb. standard lubricant drum which is easily replaced when full. Drum is not furnished. Title plate is lettered "Drain Oil."

LINCOLN ENGINEERING COMPANY

PIONEER BUILDERS OF LUBRICATING EQUIPMENT

GENERAL OFFICES, ST. LOUIS, MO. FACTORIES: ST. LOUIS, MO., DETROIT, MICH.

Two Race Classics Set for 1939 Season

Automobile racing fans have been assured of at least two national championship classics for 1939 with speed competition at the New York State Fair, Syracuse, again placed under direction of Ira Vail, title driver of the board speedway era who turned promoter in recent years. The other race contributing points toward the national championship medal awarded each year is the 500-mile International Sweepstakes at Indianapolis Speedway, May 30.

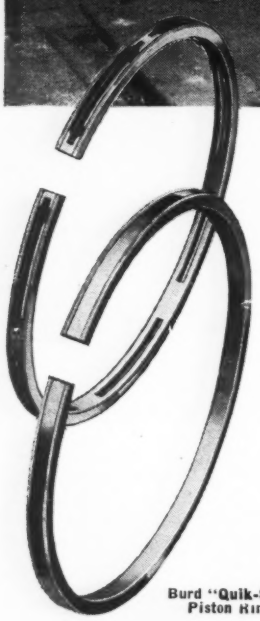
The Syracuse event, the nation's top mile speedway classic, will be run Sept. 2 and will be a 100-mile grind. It will be the twelfth year Vail has managed the Syracuse race. The race will be under supervision of the American Automobile Association's Contest Board.

Qualifying trials to select the fastest cars for the classic will be run on the morning of the race.

Also scheduled under AAA supervision is the sprint program at the Erie County Fair, Hamburg, N. Y., on August 26 and the Danbury (Conn.) Fair on October 8. Vail will also direct the running of these events.

A pre-season survey indicates that the Minnesota State Fair run speed events run each year at Minneapolis may fly the AAA banner in 1939. The fall program there has been staged in other years by the International Motor Contest Association.

Although August 19 has been scheduled for the speed event at the Illinois State Fair, Springfield, the operator of the program has not been announced.



Burd "Quik-Seal" Piston Rings

Burd is one of the very few piston ring manufacturers who make their own castings. Only thus can chemical composition and physical properties be brought under complete control of Burd metallurgists and made to embody all the refinements learned in 25 years of research and experience in precision manufacture.

The best of standard foundry practice is not good enough for Burd rings. The electric furnace, shown above, brings closer control of analysis because there is no fuel... no contact with coke to affect the chemical composition of the iron. And because Burd iron is melted with a thousand degrees more heat, its flow is faster, its structure finer, its tensile strength greater. It is uniform all the way around a ring, and all the way around the calendar... for Burd's metallurgical control makes rings uniform, though poured months apart.

Good piston rings begin with the base metal. Build your piston ring business on the soundest foundation in the industry—Burd's complete metallurgical control.

BURD PISTON RING CO., Rockford, Ill.
(Associate Company — Liberty Foundries Co.)

BURD ★ PISTON ★ RINGS

LINDBLOOM VALVE PACKING • HADEES HOT WATER CAR HEATERS

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SEATTLE, WASH. . . . 1609 Boylston Ave.
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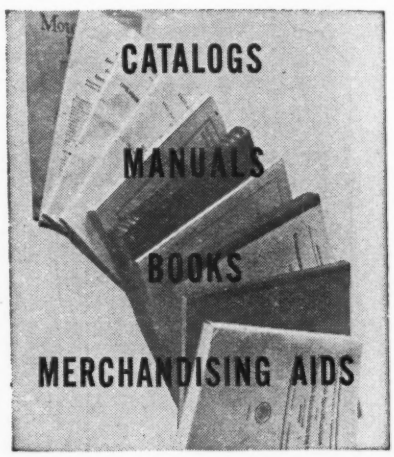
TORONTO, 5, Ont. Can. . . . 20 Hayter St.
WINDSOR, ONT., Can. . . 90 E. London St.
WINNIPEG, MAN. CAN. . . 126 Lombard St.



The finest piece of sales promotion literature to cross our desk in many a day is the new booklet by the Walker Mfg. Co. entitled "Developing Maximum Customer Traffic."

It points out that the basic measure of success which any service shop can achieve is governed by the amount of customer traffic he enjoys; that adequate lift capacity is the key to maximum customer traffic; and that adequate lift capacity means the type of lift that permits the combination of lubrication work and maintenance services, thus filling in the no-profit hours when the lubrication work is slack—hence the Walker Electric Lift, providing the key to maximum customer traffic.

A good job, well done, and worth any operator's time to sit down and study it as a means of increasing his business.

Tie in with the sales helps offered by A. Schrader's Son, 470 Vanderbilt Ave., Brooklyn, N. Y., and you'll sell more tire valves and caps. Two merchandising plans—a simple report showing missing valve stem caps sells caps to the drive-in-for-air-service customer, and another plan sells valve and cap on each tube repair job by simply installing new parts and returning the old ones to the customer in an envelope attached to the job. See your jobber or write the manufacturer for details.

The 1939 promotion program of The Crescent Co., Pawtucket, R. I., includes four envelope enclosures and a new 24-page catalog covering each of the company's products with a concise, clearly written description of all salient and outstanding features. Applications for each type of wire and cable are described.

A new lubrication guide called "Valvoline System of Chassis and Gear Lubrication, Recommendation Guide for Passenger Cars, Trucks and Tractors" has been released by the

(Continued on page 66)

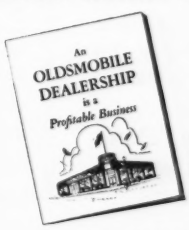
IF YOU'RE OUT TO MAKE MONEY— GO WITH OLDS!

TAKE ADVANTAGE OF OLDSMOBILE'S 10 POINT FRANCHISE FOR GREATER PROFITS

1. Liberal Discounts
2. Scientifically Allocated Territory
3. Protected Territory
4. Cars Distributed Only on Order
5. Warehoused Cars for Emergency Orders
6. Thirty-Eight Parts Depots
7. Broad Service Policies
8. Aggressive Sales Promotion Assistance
9. Timely Used Car Selling Help
10. Strong Advertising Backing

SELL A CAR THAT'S POPULAR.. A CAR WITH BROAD MARKET COVERAGE.. A CAR WITH WIDE CLIENTELE TO SERVICE!

OLDS cars and the Olds franchise form a combination that's made to order for making money! Let's check for a moment: *Oldsmobile is the oldest motor car manufacturer in America.* With Olds you have a stability of background excelled by none. *Olds has for years enjoyed a quality reputation.* With Olds you don't have to sell quality; it's taken for granted. *Olds cars for 1939 cover every price field but "high."* With Olds you sell in the market where the real volume lies. *More than a million Oldsmobile cars are on the road today.* With Olds you have a fertile field for repeat orders and a ready-made market for service. And beyond all *these* advantages, Olds offers a franchise that's one of the fairest, soundest and most desirable, from the dealer's standpoint, of any in the business. Read the ten advantages of Olds' franchise, listed at the right, then use the coupon! You ought to GO with OLDS!



GET THIS BOOK!

"An Oldsmobile Dealership is a Profitable Business" is the title of a book that explains in detail the advantages and value of the Olds franchise—sets forth Oldsmobile's complete business philosophy. Yours for the asking, in confidence and with no obligation!

D. E. RALSTON, General Sales Manager,
Oldsmobile, Lansing, Michigan.

I'd like to know more about how it would pay me to GO with Olds! Please send me your Franchise Book.

Name_____

Street Address_____

City_____ State_____

THE RED HOT LINE FOR '39

Discoverer of Vulcanization Honored

Akron presented with statue of Goodyear on Hundredth Anniversary

The centennial of Charles Goodyear's discovery of the process of rubber vulcanization was observed with a city-wide Akron celebration sponsored by the Goodyear Tire & Rubber Co., Feb. 23, when the company presented the city a large statue of Charles Goodyear, erected in a new civic mall facing the Akron Municipal Building. At a banquet attended by more than 1600 at the Akron Armory following the dedication of the statue and mall, Gov. John W. Bricker of Ohio spoke, both national radio networks carrying his message over their entire systems.

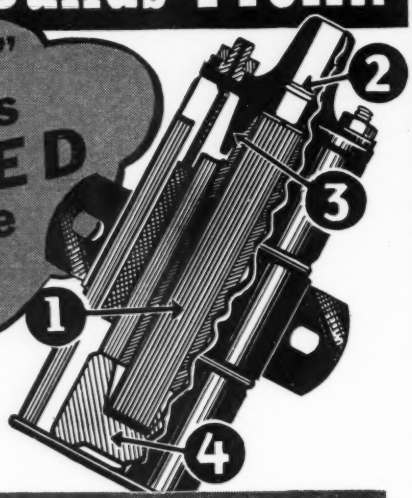
The Goodyear centennial coincided with the Goodyear company's fortieth anniversary and home coming, for which it brought more than 2000 officials to Akron from all parts of the world. The entire celebration is said to have cost Goodyear approximately $400,000.

Gen. Hugh S. Johnson addressed the Goodyear home coming rally, Feb. 21, at the Goodyear gymnasium which has been converted into a miniature world's fair of rubber. Special tributes were paid to F. A. Seiberling and C. W. Seiberling, founders of Goodyear and president and vice-president for many years of that company. Both are now officials of the Seiberling Rubber Co. P. W. Litchfield, F. A. Seiberling's first factory superintendent at Goodyear, now is Goodyear's president and chairman.

Preceding the Akron celebration, the City of Woburn, Mass., where Charles Goodyear made his discovery in 1839, staged a Goodyear centennial program Feb. 17, C. W. Seiberling presenting the city with a Goodyear memorial plaque on behalf of the Goodyear company and Akron.

This LOGIC Builds Profit!

"GUARANTEED" Ignition Parts ENGINEERED to compensate for wear



There's downright common sense in the logic which "Guaranteed" has pioneered in the design of ignition service parts. Just look at this "GUARANTEED" Coil. It's very different—because each detail is "engineered to compensate for wear" in the motor—*to meet the special needs of replacement!*

This great selling idea teems with *plus value*—with bigger volume and profit for the serviceman on *every* ignition item. "Guaranteed" goes a long way to impress that story on the motorist—hands you a bang-up array of smart sales helps that mark a new high in ignition merchandising—that promote the mechanic to the rank of successful merchant!

Write today for the new "Guaranteed" Sales Plan, built on *"engineered to compensate for wear!"*

HERE'S THE DIFFERENCE:

In the "GUARANTEED" Coils you'll see careful choice of special materials and the refinement of mechanical details to create the CORRECT BALANCE that compensates for wear in the motor. A few typical features:

1—Core of special transformer steel for fuller and more rapid charge and discharge.

2-3—Deep-set secondary insert, and longer inside Bakelite sleeve, both prevent arcing.

4—Glazed porcelain-fitted base concentrates full discharge to produce fatter spark.

GUARANTEED PARTS CO., Inc. 250 W. 54 St., N. Y. C.

ORIGINATORS OF THE WELL-KNOWN "FOUR-STAR" LINE

Pedrick Offers Prizes And Free Motor Jobs

Continuing its program to bring into repair shops all car owners interested in having motor jobs done, the Wilkening Manufacturing Co. of Philadelphia and Toronto, makers of Pedrick piston rings, announces a new plan designed to expose repairmen to many extra motor jobs and repair business.

Starting in April and continuing monthly thereafter, a contest will be conducted among car owners, and 100 Pedrick motor jobs will be given free each month to car owners in the United States plus ten in Canada. The contest is very simple, requiring only that the car owner complete, in 25 words or less, this sentence: "I want my car reconditioned with Pedrick piston rings because . . ."

Only car owners interested in getting a motor job for their car will enter the contest because that is the only thing they can win. Thus each entry will be a live prospect for a motor job immediately. A requirement of the contest is that the car owner get his Official Entry Blank from a Pedrick dealer—thus all interested car owners will go into the places of business of Pedrick dealers.

In addition to the 100 free motor jobs monthly, Pedrick offers also $500.00 in cash prizes to repairmen in the United States, plus $50.00 in Canada. This cash will go to repairmen who cooperate in the car-owner program. There are 54 cash prizes each month and the top prize is $100.00. Cash awards will be based on a contest very similar to that of car owners, and in which the repairman will finish in 24 words or less this sentence: "I use Pedrick piston rings in all my motor jobs because . . ."

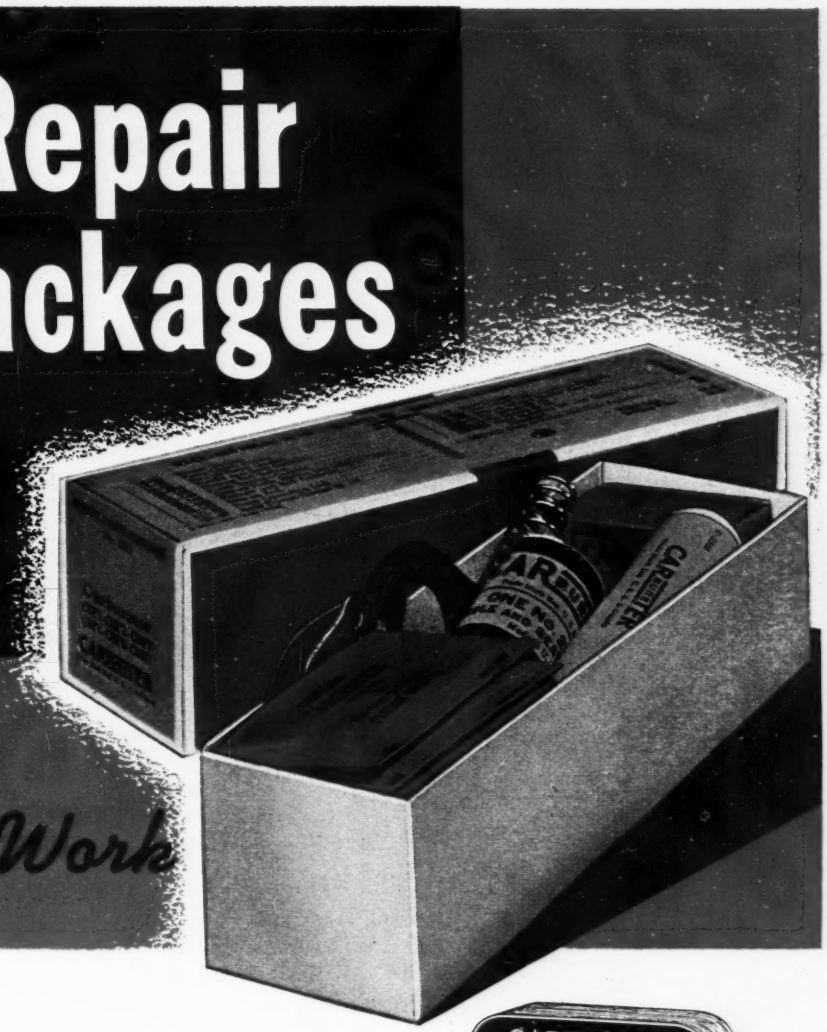
The purchase each month of just one set of Pedrick piston rings and registering as a cooperating dealer for that month gives the shop the complete program—car-owner official entry blanks, repairman official entry blank, window poster, handbills, newspaper mats, movie slides, and everything needed to promote the contest in its locality.

The contest for car owners will be advertised nationally in half-page space in *Life* every month and trade meetings will be held in every important center at which will be shown Pedrick's new sound picture entitled "Harry Pays His Bills."

Carter Repair Parts Packages

for the most popular Carter Carbureters

Save Time—Improve Your Work



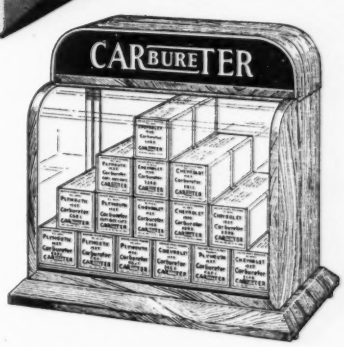
HERE is another forward step by Carter in the merchandising of service parts.

The new Repair Parts Packages for the most popular Carter Carbureters contain the necessary parts to restore original performance and mileage to carbureters that have served well for thousands of miles.

This new plan makes ordering easy and fast—eliminates digging through a long list of parts and writing down the numbers and prices one at a time. Your customer is better off too, for the package plan assures a better job because every necessary part is included.

And there's an added profit because of the saving in ordering packaged repair parts.

Ask your Carter jobber or distributor for the new Repair Parts Package—or write for catalog page and price list.



● This attractive glass tront illuminated Display Case with mirrored back and sides is yours—no charge —with your initial order for 15 Repair Parts Packages.

CARBURETER
PRODUCTS OF PRECISION

Division of American Car and Foundry Company

CARTER CARBURETOR CORPORATION

2820-56 North Spring Avenue, St. Louis, Missouri

"Early Birds" Prepare For Indianapolis Classic

Reports of new cars being prepared for the annual 500-Mile International Sweepstakes at Indianapolis are beginning to emerge from garages throughout the nation.

Probably the first championship car "unveiled" to the public was the 183 cu. in. Offenhauser which Ronny Householder, former kingpin of the midgets on the west coast, will drive for Leon Duray. Householder set the qualifying speed record for the 1938 "500" with an average of 125.77 miles per hr. The new single-seater is supercharged and is accepted by the speed fraternity as one of the fastest likely to come out of the winter blueprints.

"Mike" Boyle, the Chicago sportsman, backer of the late Bill Cummings for many years, plans to send a new Maserati into the "500" with Wilbur Shaw, 1937 winner and national champion, at the wheel.

Although engine specifications have not been revealed, new cars are reported being prepared by Joe Lencki, veteran Chicago car owner, and Frank Brisko, driver-owner of many Indianapolis campaigns.

Floyd Roberts, Indianapolis winner last year and current national champion, is scheduled to again drive for Lou Moore, top ranking driver of the latter days of the board speedways, who has managed racing teams in recent years. It is said Roberts will drive the same miller-engined Burd Piston Ring Special with which he set the current 500-mile Indianapolis record of 117.2 miles per hr. last May 30.

Many drivers have traded driving assignments for the approaching race. Reports place Babe Stapp at the wheel of Bill White's Alfa Romeo and have Rex Mays on the Joe Thorne team.

You'll be Dollars ahead in 1939 with Edison Spark Plugs.

All of the engineering resources and skill for which the Edison name is famous have been concentrated in the development of the Edison Line of Spark Plugs for 1939.

The result is one outstanding line of spark plugs, embodying features not available in any other spark plugs . . .

—The Built-In Leak-Proof Gasket
—The New Sealed-In Electrode Cap
—The New Albanite Hi-Voltage Insulator
—The Edispark Condenser-Action "Flat" Gap

. . . and supplemented by the Edison High Compression Spark Plug . . . the only modern spark plug for extreme service conditions and high speeds in modern high compression engines.

Edison offers exclusive product features with plenty of sales appeal . . . greater profit margin without cut-price competition . . . and a spark plug proposition built on a consistent, exclusive policy for independent dealers. That's why *you'll be dollars ahead* with Edison!

This window display in 9 colors is just one of the many Edison Dealer Helps.

Edison
SPARK PLUGS

EDISON-SPLITDORF CORP.
West Orange, New Jersey

ONE OF THE Thomas A Edison INDUSTRIES

Indian Head Radiator Cement

A new product of the Permatex Co., Inc., Sheepshead Bay, N. Y. In finely powdered form, this cement dissolves immediately when added to the water of a cooling system. Manufacturer claims it will quickly and permanently stop leaks, will not clog a radiator, and that it mixes with all types of anti-freeze and does not attack aluminum parts.

New Firm Organized to Handle Replacement Parts

Announcement has been received of the formation of a new company, the Hawk Products Corp., for the purpose of manufacturing and distributing a full line of parts for use in repairing the different makes of carburetors and other automotive accessories. President and general manager of the new company, which is located in Indianapolis, is S. R. Hawkins, sales service manager for the Schebler Carburetor Co. for many years and, during the past eight years, vice-president of the Langsenkamp-Limkert Carburetor Co.

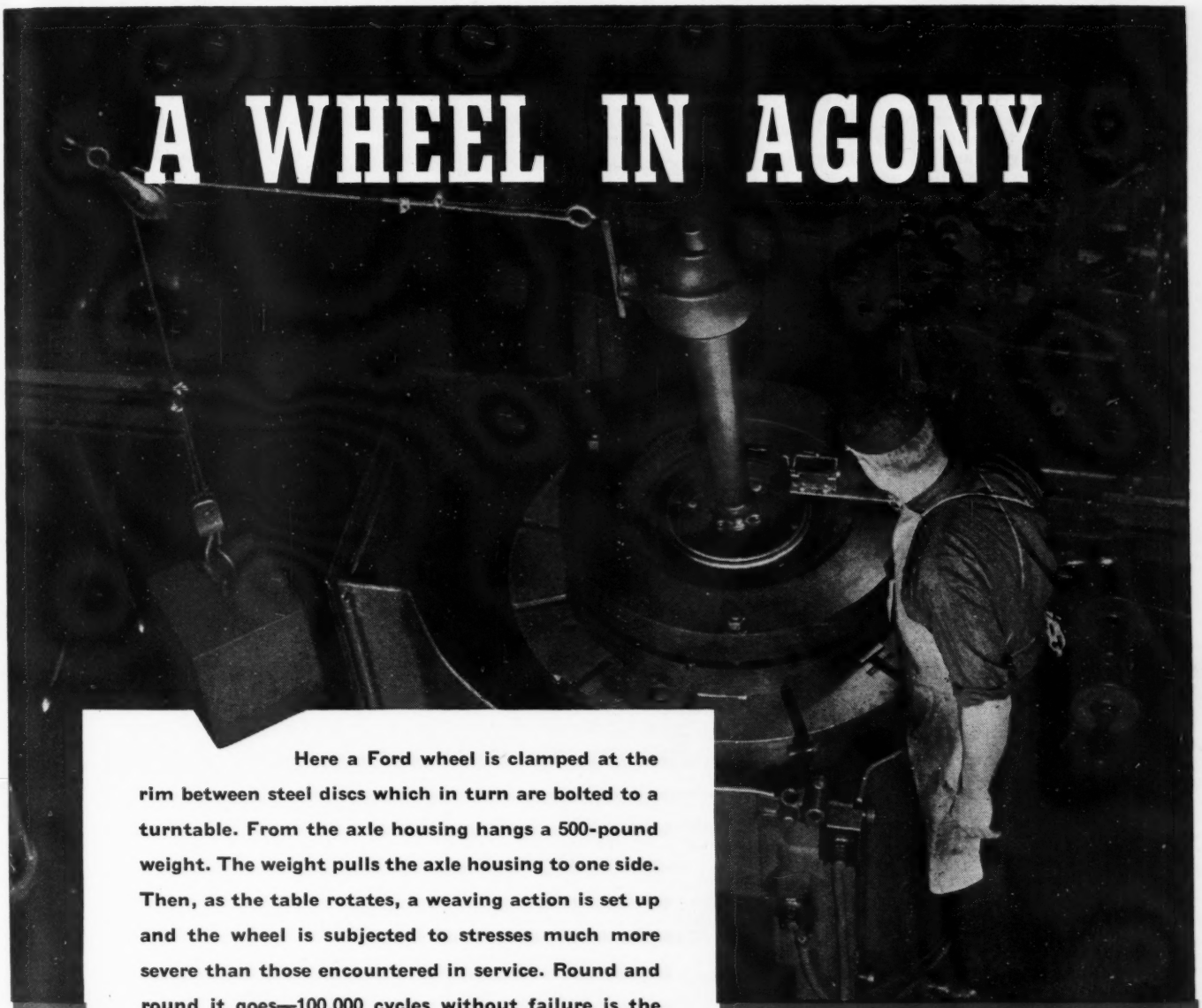
The company has released two new catalogs. One (No. 100B) covers Hawk replacement service parts for Stromberg, Marvel and Schebler carburetors and also heat riser sleeves and tools. The other (No. 100A) covers Hawk replacement service parts for Chevrolet, Plymouth and all cars and trucks using Carter and Carter BB carburetors.

Linco Acquires Standix Service Station Items

According to announcement made to the trade by both Lubrication Corp., Chicago, and the Linendoll Corp., Chicago, many of the service station equipment items formerly merchandised under the "Standix" name will hereafter be manufactured and sold by the Linendoll organization.

The acquisition of "Standix" products, including Kent Pressure Pack, Wheel Pack, Flex-Tap Dispenser, Pressure Lube Dispenser, Gun Loader, Barrel Filler, and Turi-Vac Cleaner brings into the Linco family a well advertised and nationally merchandised group of equipment.

A WHEEL IN AGONY



Here a Ford wheel is clamped at the rim between steel discs which in turn are bolted to a turntable. From the axle housing hangs a 500-pound weight. The weight pulls the axle housing to one side. Then, as the table rotates, a weaving action is set up and the wheel is subjected to stresses much more severe than those encountered in service. Round and round it goes—100,000 cycles without failure is the Ford standard for this test.

This picture shows one of the many endurance tests applied to parts by the Ford Motor Company. Such tests subject the parts to far greater strain than actual usage will place upon them. These tests protect the standard of quality maintained for the Ford car and for the Genuine Ford Parts made available for replacement use.

If you use only Genuine Ford Parts in service operations, you will be sure your replacements will perform well and earn for you your customers' satisfaction.

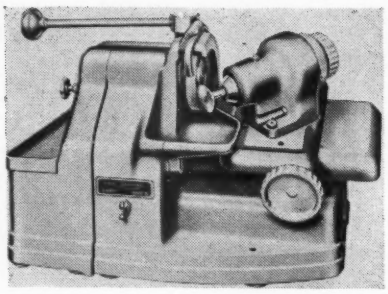
The Genuine Ford Parts Distributor in your neighborhood is equipped to give you fast service—often delivery right to your door. He keeps a complete stock and is set up to give you the quick, personal service you want. Many Distributors maintain Parts Panel Trucks that call on the servicemen in their neighborhood regularly, helping them keep a well-balanced inventory. Avail yourself of this service for servicemen. Get acquainted with the Ford Parts Distributor in your neighborhood.

FORD MOTOR COMPANY

Wet-Type Refacer

If you prefer wet-type valve refacers, Van Norman Machine Tool Co., Springfield, Mass., has a new one. It will take valves from 15/64 in. to 9/16 in., in the split, double-grip collet which is guaranteed accurate within .001 in. Operation is high-speed, with the valve center located below the wheel center to eliminate splash or spray. A special new type of coolant is used, rust-proof, non-inflammable, non-injurious and bright red in color. Adjustable to 30 and 45 deg. angle. The new machine is identified as Model ARW.

For dry refacing there is a new



model AR, with other features the same as Model ARW. Also announced is a new heavy duty Ro-Cen-To Valve Seat Grinder which features the new Van Norman ball bearing arbor with hardened sleeve.

"Ina-Counter" Drawer For Fittings

Did you ever wonder what to do with those nuts, bolts, valves, unions, elbows, pet cocks and all the other small parts lying around? Usually the service man does not know which fittings to stock for popularity—with the result that all are thrown together in a box where he tries hopelessly to find the part when needed.

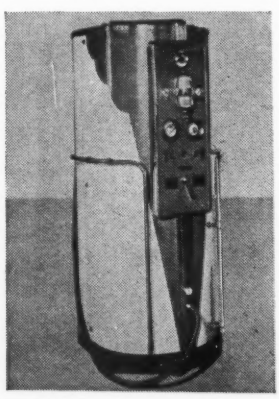
The new "Ina-Counter" Drawer changes all this. Now a heavy gauge steel drawer with 64 separate compartments, set on roller bearings—slides out from under the bin or counter or shelf and glides back with very little effort. The most popular brass fittings are placed in the separate compartments — each plainly marked.

A feature of the drawer is its dust-proof steel cover. When the drawer is closed, the cover lies flat, prevents dirt and dust from entering. When the drawer is open, the cover raises to a vertical position and on it is lithographed in three colors a chart illustrating over 100 types of fittings, their sizes and ordering numbers. This chart enables the service man to quickly order brass parts correctly with a minimum of effort.

Each drawer is sold at a special combination rate with a stock of 250 Brass Fittings of 27 of the most popular types. They can be used on most model cars. Write for descriptive literature to E. Edelmann & Co., 2332 Logan Blvd., Chicago.

Graco Motor Vitalizer

Remove gum and sludge from that engine and restore compression, power and efficiency by flushing regularly with the Graco Motor Vitalizer. A self-contained unit with ¼ hp. electric motor and rotary oil pump which forces solvent in and out of engine at the rate of 4 gal. per min. Attaches to the crankcase drain opening



by universal connection and has a performance meter which shows the customer the improvement in motor performance resulting from Vitalizer operation. Model MV-100 supplied complete with 2-gal. can of Vitalene Concentrated Gum Solvent. Made by Gray Co., Inc., 6011th Ave., N. E., Minneapolis, Minn.

Don't let the SPOTS fool you...

It takes a CAR to prove a polish!

Without much *elbow grease* you could use *bear grease* to put a nice bright "spot" on a dull car. But if you really want to know what a polish has . . . and how easy (or hard) it is to use, try it on a turret top job and go the whole distance.

Then you'll find out about polish. And if you'll try Tumbler Liquid Wax on this basis, you'll find out why Tumbler can make claims that have never been *lived up to* before.

Tumbler Liquid Wax combines *for the first time* all the ease of application of the finest liquid polish . . . with the beautiful and permanent result of the finest wax.

At your wash rack . . . and in your specialty department you'll find it a money-maker.

J. A. TUMBLER LABORATORIES
Baltimore, Md., U. S. A. • Toronto, Canada

Tumbler Liquid Wax is a chemical achievement that has taken years to perfect. Through the development of an exclusive homogenizing method, the emulsification of Tumbler Liquid Wax affords a completely dispersed, fine colloidal sol. Hard brittle waxes are reduced to a tempered film and the emulsified, sub-microscopic particles spread so finely that a minimum of rubbing effects an optically plane surface that is highly lustrous and greatly resistant to dirt, dust and finish oxidation.

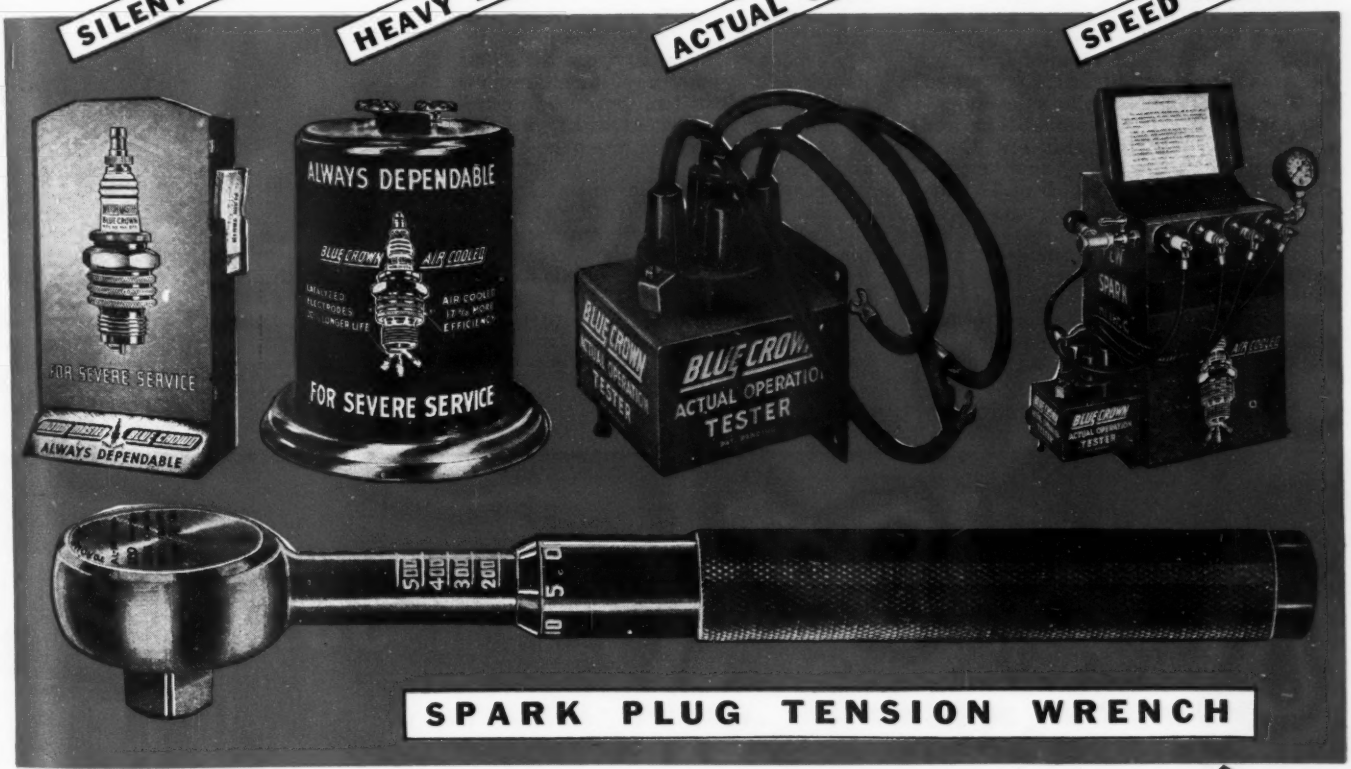
They are All FREE

SILENT SALESMAN

HEAVY DUTY CLEANER

ACTUAL OPERATION TESTER

SPEED TESTER



HOW TO SELL MORE SPARK PLUGS—MAKE MORE MONEY and get FREE TOOLS besides!

You don't know how much easier it is to sell Blue Crowns—you don't know how much better satisfied your customers will be with Blue Crown's exclusive Air Cooled performance—you don't know how much bigger your sales and profits will be—UNLESS YOU MAIL THE COUPON and see how thousands of Blue Crown Dealers are really cashing in on Spark Plug Sales. How much longer are YOU going to be chained to habit and pass up the opportunity of selling a better priced, better performing spark plug made by a manufacturer who *really* gives you your rightful share of the profits? MAIL COUPON and get the BLUE CROWN PROFIT SHARING PLAN.

BLUE CROWN

MOTOR MASTER PRODUCTS CORPORATION
4759 Ravenswood Ave., Chicago, Ill.

EXPORT DISTRIBUTION
Borg Warner International Corp., Chicago, U. S. A.

Without obligation send me NEW BULLETIN giving complete details on how I can obtain FREE TOOLS illustrated above.

Name.....

Address.....

City..... State.....

My Jobber's Name is.....

"Wild Bill" Cummings Killed in Car Crash

Passenger car mishap ended colorful career of veteran race driver

Irony of the fates which govern the charmed lives of automobile racing kings brought an end to the spectacular career of William "Wild Bill" Cummings last month several hours after his passenger car wrecked on an Indianapolis highway near his home.

The former national speedway champion and world Diesel speed record holder of 1935 succumbed in a hospital of injuries suffered when his car skidded on a curve, was hurled over a guardrail and overturned in a creek. (See picture page 31.)

The 1934 Indianapolis winner, an opponent of two-man racing cars because of the hazard to the riding mechanic in event of accident, went alone to his death. He was unaccompanied in the car he was driving from downtown Indianapolis, where he was working during the winter months as an automobile salesman.

Fearless in speed competition and a king among thrill producers, Cummings lived by the theory that "everything happens for the best." Outstanding of the new superstitions he supported was the request to his wife, Mrs. Leota Cummings—known to the speed fraternity as "Peggy"—that she never eat peanuts on the speedway grounds. Refusing to engage in the dramatics expected of the racing clan, Cummings never revealed the true reason for this superstition.

A native of Indianapolis, Cummings resided as a boy within the shadow of the famous Indianapolis Speedway where he rose to International fame which attended him until his passing. He often admitted that he thrilled to the roar of the speeding motors as he played in the yard of his home and boasted in his shy manner that he could distinguish the engine of Barney Oldfield.

When he led the Indianapolis field to victory in 1934, Cummings fulfilled a promise he made to his mother while listening to the Oldfield car one day. His father also was a racing driver, but never attained the peak to which "Wild Bill" soared the Cummings name.

Respected for many contributions as one of the most popular champions the speed sport has produced, Cummings received the greatest plaudits of those close to him when he smiled through one of the most disheartening reverses ever recorded at Indianapolis. That was in 1936, when his car failed to get away from the starting line as clutch trouble developed at the crucial starting hour. Contributing to his hardship was the fact that several days before he had turned in the fastest qualifying lap and had been assigned the coveted pole position inside on the front row.

"Wild Bill" Cummings

Although hysteria would have been in order, Cummings stood patiently by while his mechanics worked frantically in a futile effort to adjust the difficulty. Not a word of criticism of his crew was voiced by the former

Grey-Rock
THE FASTEST
GROWING LINE
MARCHES ON
WITH 35,000,000 S
LIFE
WINGS NORTH—By ROBERT ORMOND CASE
Grey-Rock BALANCED BRAKSETS
UNITED STATES ASBESTOS DIVISION of Raybestos-Manhattan, Inc., MANHEIM, PA.
BRAKE LININGS • CLUTCH FACINGS • FAN BELTS • HOSE • PACKINGS • RELINING EQUIPMENT

champion. When he was given the verdict that he was definitely out of the race, Cummings smiled through his disappointment with the comment: "Well, everything happens for the best."

His greatest regret apparently was felt in the disappointment to Jimmy Dunn, the movie star, who had come to Indianapolis from Holywood "especially," as Dunn put it, "to see Bill win this race."

Remote Control Spotlight

Moving lights is one of the most eye-compelling forces known, and the remote control spotlight offered by Buell Mfg. Co., 2975 Cottage Grove Ave., Chicago, Ill., contains that feature. Mounted on the front bumper bracket, the beam of light is focused slightly above the bumper but well below eye level. A control button on the floor operates the light—the reflector and light bulb move from side to side, sweeping the road ahead with a concentrated light beam that eliminates blind spots but does not dazzle the eyes of the approaching driver. Outfit complete with chrome plated mounting bracket, foot button and lead wire, $17.50.

Jersey Midget Track to Open

The outdoor Nutley (N. J.) Velodrome, a board track for midget cars, was scheduled to open its weekly card on March 19, Jack Kochman, operator of the track, said he would stage races each Sunday afternoon until summer when a semi-weekly card will be offered.

S. N. McCaleb, Detroit, Michigan, in his book, "Charts and Their Application," offers the above as a selling help for the service manager in his efforts to sell engine tune-up jobs, points, plugs, condensers, ignition cables, valve grinding jobs and carburetor overhauls. As an example, locate miles-per-gallon in the top row of figures; a car designed to give 15 miles per gallon is found to be actually delivering only 11. The figure at the bottom of the "V" formed by the lines connecting 11 and 15 is 243, representing the number of gallons of gasoline that are being used in excess of the number that would be used during 10,000 miles of operation if the car was performing up to its standard. In other words, an engine tune-up (if that is all that is required to restore standard performance) would save the owner the cost of 243 gallons of gas in 10,000 miles of operation. If the tune-up alone does not restore standard performance, but does bring it up from 11 to 13 miles per gallon, it will save the owner the cost of 140 gallons of gas in 10,000 miles of operation.

C.S.R.A. to Mother Midgets

The Central States Racing Association, youngest of the top speed supervisory boards, will take midget racing under its wing this summer, according to plans announced by Norman Witte, secretary, at Dayton, Ohio. Witte said the schedule has not been prepared but promised a crowded schedule of vest-pocket races under the CSRA banner.

The association recently ruled that midget events under its sanction must pay a minimum prize purse of $700. Competition events will call for $500 and time trials will pay the $200.

O SALES CALLS EACH MONTH

NATIONAL ADVERTISING
IN AMERICA'S FOUR MOST INFLUENTIAL WEEKLY MAGAZINES.

COMPLETE TIE-IN CAMPAIGN. THE INDUSTRY'S FINEST REPLACEMENTS AND TECHNICAL HELPS.

GROW WITH GREY-ROCK

Ask your jobbers' salesmen for all details. They're in this book.

New Type Car Seat Uses Leaf Springs

Radical innovation in seat design is promised by a new development which is to be introduced by the F. L. Jacobs Co., Detroit, Mich., prominent manufacturers of tubular seat frames. This company is working on a unique design in which the conventional coil spring seat construction is to be replaced by a nest of 28 to 30 leaf springs mounted on a tubular frame.

It is claimed that this type of seat construction makes possible a very important weight saving, ranging from 25 to 40 per cent of the total weight of the present seat, which makes possible a net saving of from 25 to 50 lb., for a front seat. Better comfort and almost indefinite cushion life are anticipated for heavy-duty seats for commercial vehicles and heavy trucks.

The leaf spring seats are not yet in production but samples are being shown to various manufacturers in the automotive field.

Hydraulic Truck Hoist

Now you can have a hydraulic hoist for your dump truck, to operate by hand. Dumps up to 5 tons payload, weighs 280 lb. as against an average of 700 lb., hand operated on scissors principal, dumps to 50 deg. angle with 8-9 ft. bodies, and 40 to 45 deg. angle with bodies up to 12 ft. Ram is of electric weld pipe, bored and honed to fit. Piston fitted with leather washers to prevent scoring. Release valve provides safety feature. Price $100. For complete information write the manufacturer, Knauss - Cassel Mfg. Co., 101 Seventh St., Peoria, Ill.

Sprayit Spray Gun

For all types of spray painting, the new Sprayit STR Streamline Spray Gun fills the bill. Instantly convertible from bleeder to non-bleeder type, for use either on air line or with portable compressor. Furnished in two styles—pressure feed with round, fan,

and angle spray internal mix spray nozzles or as a spyhon feed with external break-up nozzle with round or fan spray patterns from the same nozzle. Light weight, with true revolver grip, with oil and moisture filter built into the handle. List price of the complete spray gun with quart aluminum container and 3 nozzles, $6.50. The Electric Sprayit Co., Inc., 220 North Broadway, Milwaukee, Wis.

Radio Antennas by RCA

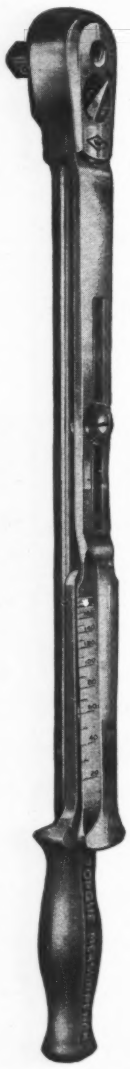
Pick up your favorite radio program through the new low-cost auto antennas announced by the Parts Division of the RCA Mfg. Co., Camden, N. J. The new Cowltenna, No. 9855, offers complete mechanical and electrical "soundproofing" by preventing rattles in the antenna and the resultant electrical disturbances in the radio. Three-section telescopic, chrome plated. Price $3.35.

The new Rodtenna features the simple hinge-type mounting with a special bracket which allows tilting of the antenna in harmony with the car's lines. Three-section telescopic, with extended length of 69 in. List price $3.00.

Assembly Cost

More than a million dollars an hour is spent to supply materials and parts to the assembly lines of the automobile factories when production is at its height, according to the Automobile Manufacturers Association. This is at the rate of $20,000 a minute.

Trains, trucks and steamships are constantly on the move with these supplies. In a busy year the intake represents purchase by the automobile manufacturers of as much as $2,250,000,000 in goods produced in factory and mine and on farm.



a pride to own . .

A "HONEY" TO USE

WILLIAMS' NEW TORQUE

"MEASURRENCH" S-57

Here's a new wrench, at moderate price, for precise measuring of tension on nuts, bolts, studs! An easily-read scale indicates applied tightening pressure from 20 to 200 foot pounds. For sound signal, a simple, movable indicator is set to any desired pressure of 35 foot-pounds and up — the sound device then tips you off when correct pressure is reached. Measures right hand torque only—but wrench action may be reversed for left hand turning. Has all Williams' reversible ratchet features. Fits Standard "Supersockets," or others having ½" square drive. *Ask for* S-57 — whenever limited and equal tension is required.

Write for literature of the complete Williams' line including all types of wrenches, pliers, screw drivers, chisels and punches.

WILLIAMS

SUPERIOR DROP-FORGED TOOLS

TORQUE "MEASURRENCH"

J. H. WILLIAMS & CO.

221 Lafayette St. New York, N. Y.

Western Warehouse and Sales Office: Chicago Works: Buffalo

PARTS NUMBERS AND PRICES

Studebaker Model 9A—Commander—6 Cyl.—1939

Front Suspension

Mfr's Part No.	No. Per Car	List Price Each
191093—Knuckle & arm, L..	1	$8.50
*194319—Knuckle, L.	1	7.50
191131—Knuckle support, L.	1	8.00
510869—Support bushing ...	4	.20
191136—King pin, L.....	1	.75
*193643—King pin	2	3.00
*194241—King pin brg., up...	2	.60
*194132—King pin bush., low.	2	.20
T82—Pin thrust brg.....	2	....
*194257—Pin thrust brg.....	2	.76
510141—King pin lock pin...	2	.08
191203—Support arm, up. (T)	2	5.00
*193988—Support arm, up. L.	1	5.50
*195897—Upper arm pin.....	2	.85
*194347—Up. arm pin bush...	4	.15
191679—Upper arm pin.....	2	.90
185792—Upper arm pin bush.	4	.50
182920—Upper arm in. bush.	8	.25
*194247—Upper arm in. bush.	8	.15
*193629—King pin yoke, L...	1	1.90
191924—Spring control link..	2	2.25
*193723—Spring control link.	2	1.75
189604—Link bushing, out...	4	.10
191393—Link bushing, in....	4	.15
*192701—F. spring (15 leaves)	1	18.25
183546—Spring bushing	2	.40
*195765—Tie rod assem., L...	1	4.00
193134—Tie rod assem., C...	1	4.50
192907—End assem., L.....	1	1.60
193638—Knuckle arm, L.....	1	1.75
191694—Hub & drum, L.F...	1	9.00
191691—Front brake drum..	2	4.35
14274—Wheel brg. cup, in...	2	....
14125—Wheel brg. cone, in..	2	....
09194—Wheel brg. cup, out..	2	....
09074—Wheel brg. cone, out.	2	....
191703—Grease retainer	2	.35
S315—Lining set, 2 wheels..	1	3.20

Steering

*195463—Pitman arm	1	2.50
*193887—Idler arm	1	2.25
189138—Cross shaft	1	4.50
192611—Gear housing	1	5.30
192560—Tube and worm.....	1	6.75
190318—Worm brg. cup.....	2	.50
1X33—Worm brg. ball.....	24	.02
192556—Jacket tube	1	2.60
194689—Tube, steering shift.	1	2.60
181259—Jacket tube bush....	1	.20
189789—Steering wheel	1	5.50

Cooling

195086—Rad. core assem....	1	38.00
270691P—Rad. shell, prime..	1	13.50
269473W—Rad. grille, L.....	1	5.00
195586—Thermostat	1	1.75
192254—Shaft and impeller..	1	1.50
187612—Shaft bushing, F....	1	.30
510240—Pump packing	4	.06
195531—Fan blades	1	1.00
187844—Fan belt	1	1.40

Fuel and Exhaust Systems

192466—Carburetor assem...	1	14.50
P-23302—Choke thermostat.	1	....
187706—Fuel pump	1	6.00
188702—Fuel & vac. pump..	1	9.50
192107—Inlet manifold	1	4.75
193037—Exhaust manifold ..	1	7.50
192695—Muffler	1	3.75
192307—Tail pipe	1	2.25
191766—Exhaust pipe	1	2.00

Engine Gaskets

192105—Carb. to mani.....	1	.07
187708—Fuel pump	1	.02
188728—Fuel & vac. pump..	1	.02
189340—Exh. pipe flange....	1	.10
510066—Mani. to block.....	1	.30
187003—Inl. to exh. mani....	1	.20
191933—Cylinder head	1	.90
186710—Oil pan	1	.25
187106—Main brg. seal.....	2	.03
186668—Timing case cover..	1	.15
510128—Valve side plate....	2	.10
186888—Water outlet	1	.05
189326—Water pump to cyl..	1	.03
189163—Water pump cover..	1	.04
S343—Valve grind set.....	1	1.25
S292—Manifold set	1	.60

Engine Parts

191853—Block with pistons, pins and rings....	1	90.00
191427—Cylinder head	1	11.00
192679—Cylinder head (spl.)	1	18.50

Engine Parts—continued

Mfr's Part No.	No. Per Car	List Price Each
191857—Cylinder block only.	1	$57.50
191089—Oil pan	1	4.75
189698—Crankshaft	1	38.50
187223—Camshaft	1	12.50
186688—Vibration damper ..	1	1.25
191561—Flywheel	1	7.50
187050—Flywheel gear	1	2.00
191859—Piston & pin.....	6	4.25
193340—Compression ring ..	12	.40
191413—Oil ring	6	.65
170045—Piston pin	6	.55
168885—Pin clamp screw....	6	.06
186607—Con. rod, 1-3-5 exch.	3	2.50
187171—Inlet valve	6	.60
189320—Exhaust valve	6	1.00
188645—Valve spring	12	.20
188646—Valve spring seat...	12	.15
174837—Valve key	24	.08
186666—Valve guide	12	.30
187335—Valve lifter	12	.55
186727—Valve lifter spring..	12	.04
127269—Valve adj. screw....	12	.10
183898—Crankshaft gear ...	1	2.50
183905—Camshaft gear	1	7.50
MAIN BEARINGS		
187253—No. 1	1	3.00
187257—Nos. 2 & 3.....	2	1.65
187261—No. 4	1	2.00

Engine Oiling

186678—Oil pump assem.....	1	5.75
186605—Pump shaft	1	1.15
178370—Pump drive gear....	1	1.25
173422—Pump driven gear..	1	1.25
173423—Pump idler gear....	1	1.25
182075—Relief valve spring..	1	.05
192850—Filter cartridge	1	1.50

Clutch

191569—Housing	1	7.50
196944—Release bearing	1	2.40
192909—Disk & facing	1	8.00
188610—Disk facing, F.. ...	1	1.05
188611—Disk facing, R.....	1	1.55
185760—Press. plate	1	2.80
186748—Press. plate & cover	1	8.55
186852—Pressure spring	9	.15
193123—Spline shaft	1	9.50
510168—Pilot bushing	1	.20
192302—Spline shaft brg., R.	1	4.85

Transmission

Standard shift, less overdrive and F-W.

193088—Case	1	10.00
188285—Countershaft	1	1.00
188291—CS. bearing	44	.02
193122—CS. gear cluster....	1	9.75
193083—Mainshaft	1	7.50
188295—Mnshft. pilot brg....	14	.02
134030—Mnshft. brg., R.....	1	4.60
193121—Low sliding gear....	1	5.50
193120—Second speed gear..	1	7.25
193058—Reverse idler gear..	1	2.85
192667—Synch. clutch gear..	1	17.50
192280—Cover	1	1.75
192178P—Shift lever	1	2.85
192343—Shift bar & fork, low.	1	3.75
192340—Shift bar & fork, 2nd	1	3.50

Overdrive Unit

196172—Housing	1	10.00
196174—Stationary gear	1	10.00
196193—Cage assembly	1	14.50
196187—Clutch assembly ...	1	14.75
193467—Clutch sleeve	1	9.50
190922—Overdrive shaft	1	8.50
190893—O-D sleeve	1	11.00
130262—Rear bearing	1	4.00

Universals

187432—Slip joint assem.....	1	8.00
187376—Spline yoke	1	4.15
187426—Cross	2	1.95
182541—Cross brg. assem....	8	.65
191891—Trans. flange	1	2.25
187625—Pinion shaft flange.	1	2.85
193220—Shaft & yoke.....	1	9.75
195430—Shaft & yoke, O-D..	1	9.00

Rear Axle

191689—Housing	1	25.50
189952—Cover	1	1.10
511674—Cover gasket	1	.10
195117—Differential case ...	1	7.90
510721—Differential pin	1	.75
510716—Differential pinion..	2	1.00

Rear Axle—continued

Mfr's Part No.	No. Per Car	List Price Each
511677—Diff. side gear	2	$2.50
190027—Pinion & ring gear..	1	18.00
184160—Pinion oil seal.....	1	.65
02872—Pinion cone, F.....	1	....
02820—Pinion cup, F.....	1	....
31593—Pinion cone, R.....	1	....
31520—Pinion cup, R.....	1	....
25523—Diff. cup	2	....
25577—Diff. cone	2	....
190747—Grease retainer, in..	2	.05
193049—Grease retainer, out.	2	.55
191707—Axle shaft	2	5.75
25877—Axle shaft brg. cone.	2	....
25821—Axle shaft brg. cup..	2	....
191696—Hub & drum, L.R...	1	7.75
191691—Rear brake drum...	2	4.35
S315—Brake lining, 2 wheels	1	3.20

Rear Springs

195744—Assembly (sedan) ..	2	11.25
191769—Front bolt	2	.50
178789—Front eye bushing..	2	.30
189342—Shackle	2	.75
184996—Shackle bushing ...	4	.40

Electrical

IGW4101—Distributor assem.	1	8.85
IGB1240—Distributor cap ..	1	.90
190155—Dist. vac. control...	1	1.50
IGW3028S—Contact set	1	.90
IGB1239—Rotor	1	.35
IGB1025—Condenser	1	.70
IG3033YS—Coil (service) ...	1	3.90
196094—Ign. switch & cable.	1	2.50
195593—Lighting switch	1	.55
193032—Stop light switch...	1	.60
191939—Magnetic switch ...	1	1.30
195596—Starter button	1	.40
192484—Dimmer switch	1	.60
196218—Ammeter	1	1.25
196198—O-D solenoid	1	....
195774—O-D solenoid switch	1	....
195787—O-D relay	1	....
GDA4804A—Generator assem.	1	....
196297—Gen. brush set.....	1	.70
196295—Gen. armature exch.	1	6.50
3203—Drive end bearing....	1	1.15
195655—Voltage regulator ..	1	7.00
MAW4015—Starter assembly	1	26.75
MAW12—Starter brush	2	.20
MAW13—Starter brush	2	.20
MAW2091—Starter armature	1	6.80
EBA12—Starter drive exch..	1	4.25
EBA1205—Starter spring ...	1	.55
269609—Headlamp assem. ..	2	6.00
269619—Headlamp reflector .	2	1.75
269601—Headlamp lens	2	1.75
269901—Rear lamp, L.....	1	2.50
270244—License lamp & handle	1	4.50
269908—Rear lamp lens, L..	1	.30
195805—Bat. to switch cable	1	.60
195120—Bat. ground cable...	1	.35

Body and Sheet Metal

(4-DOOR SEDANS) (IN PRIME)

269460—Front fender, L.....	1	21.00
269707—Rear fender, L.....	1	10.50
270447—Hood top panel.....	1	38.00
270595—Hood side panel, L..	1	10.50
266937—Cowl vent. seal.....	1	.50
267770—Door, stripped, L.F.	1	27.50
269578—Trunk lid	1	15.00
266807—Glass regltr., L.F...	1	1.25
264932U—Remote cntrl., L.F.	1	.50
268193—Door sill, L.F.....	1	1.65
270055W—Door handle, out..	4	1.35
270227—L.F. door ventilator.	1	13.50
269483—Running board, L...	1	8.50
191779—Run. brd. bracket, F.	2	.70
195262—Front bumper	1	11.50
195713—Rear bumper	1	11.50

Miscellaneous

195910—Hand brake pawl...	1	.15
195984—Hand brake sector..	1	.50
189244—Master cyl. assem...	1	5.50
185452—Check valve	1	.55
185438—Master cyl. cup.....	1	.20
185444—Secondary cup	1	.20
185453—Master cyl. boot....	1	.35
192509—Wheel cyl., L.F.....	1	2.50
185471—F. wheel cyl. cup, F.	2	.25
185472—R. Wheel cyl. cup, F.	2	.25
185473—Wheel cyl. cup, R...	4	.20
185475—Wheel cyl. boot, R..	4	.15
185474—Wheel cyl. boot, F..	4	.15
*194980—Chassis frame	1	60.00
*194538—Shock absbr., L.F..	1	6.50

*After car serial 4,112,701.

Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the

Line Number	MAKE AND MODEL	Lowest Priced 4-d. Sed. (Dlvd.)	Wheelbase (In.)	Tire Size (In.)	ENGINE: No. of Cylinders, Bore and Stroke	Taxable Hp.	Piston Displacement (Cu. In.)	Maximum Brake HP. at Specified R.P.M.	Compression Ratio (to—1.)	Displacement Factor §	Cylinder Head Material	Camshaft Drive Make	Piston Material	Oil Cleaner Make	Air Cleaner Make	Carburetor Make	Muffler Make	Electrical System Make	Battery Make	CHASSIS: Clutch Type and Make	Gearset Make	Universals Type and Make	Rear Axle Type and Make	Rear Axle Ratio	Front Spring Suspension
1	Bantam.....60	497½	75¼	5.00/15	4-2.2x3.0	7.75	45.6	20-4000	7.00	23.0	CI	Own	Als	No	Don	Til	Buf	AL	USL	P.Ro	WG	m-UP	½ Spi	5 25	Tr
2	Buick.....39-40	996	120	6.50/16	8-3 3/8x4 1/8	30.6	248.0	107-3400	6.10	39.9	CI	LB	Ala	No	AC	Car	Wal	DR	Del	P.Own	Own	Rb-Mec	½ Own	4.44	IC
3	Buick.....39-60	1246	126	7.00/15	8-3 7/16x4 1/8	37.8	320.2	141-3600	6.25	42.3	CI	LB	Ala	No	AC	Str	Wal	DR	Del	P.Own	Own	Rb-Mec	½ Own	3.90	IC
4	Buick.....39-80	1543	133	7.00/16	8-3 7/16x4 1/8	37.8	320.2	141-3600	6.25	39.4	CI	LB	Ala	No	AC	Str	Wal	DR	Del	P.Own	Own	m-Spi	½ Own	4.18	IC
5	Buick.....39-90	2074	140	7.50/16	8-3 7/16x4 5/16	37.8	320.2	141-3600	6.25	38.5	CI	LB	Ala	No	AC	Str	Wal	DR	Del	P.Own	Own	m-Spi	½ Own	4.55	IC
6	Cadillac V8-39-61-60S	1680	126-127	7.00/16	8-3½x4½	39.2	346.0	135-3400	6.25	44.5	CI	Mor	Ala	No	AC	Str	Wal	DR	Del	P.Long	Own	Nb-Mec	½ Own	3.92	IC
7	Cadillac....V8-39-75	2995	141	7.50/16	8-3½x4½	39.2	346.0	140-3400	6.70	40.1	CI	Mor	Ala	No	AC	Str	Wal	DR	Del	P.Long	Own	Nb-Mec	½ Own	4.58	IC
8	Cadillac-V-16...39-90	5140	141	7.50/16	16-3¼x3¼	67.6	431.0	185-3600	6.75	44.3	CI	Mor	Ala	AC	AC	Car	Wal	DR	Del	P.Long	Own	Nb-Mec	½ Own	4.31	IC
9	Chevrolet. Master 85	689	112¼	6.00/16	6-3½x3¾	29.4	216.5	85-3200	6.25	35.2	CI	Own	CI	No	AC	Car	Var	DR	Del	P.Own	Own	p-Own	½ Own	3.73	C
10	Chevrolet. Mas. DeL.	720	112¼	6.00/16	6-3½x3¾	29.4	216.5	85-3200	6.25	39.2	CI	Own	CI	No	AC	Car	Var	DR	Del	P.Own	Own	p-Own	½ Own	4.22	IC
11	Chrysler...Roy. C-22	1010	119	6.25/16	6-3 5/8x4½	27.3	241.5	100-3600	6.50	38.5	CI°	Mor	Ala	Pur	AC	Car	NS	AL	Wil	P.B&B	Own	Nb-UP	½ Own	4.10	IC
12	Chrysler...Imp. C-23	1198	125	7.00/16	8-3¼x4 7/8	33.8	323.5	130-3400	6.80	42.5	CI°	MW	Ala	Pur	AC	Str	NS	AL	Wil	P.B&B	WG	Nb-UP	½ Own	3.91	IC
13	Chrysler.Cus.Im.C-24	2595	144	7.50/16	8-3¼x4 7/8	33.8	323.5	132-3400	6.80	....	AI	MW	Ala	Pur	AC	Str	NS	AL	Wil	P.B&B	WG	Nb-UP	½ Own	4.90	IC
14	De Soto De L.&C. S-6	970	119	6.00/16	6-3 5/8x4¼	27.3	228.1	93-3600	6.50	37.7	CI°	Mor	Ala	Pur	AC	Car	NS	AL	Wil	P.B&B	Own	Nb-UP	½ Own	4.10	IC
15	Dodge Spec.&DeL.Six	855	117	6.00/16	6-3¼x4 3/8	25.3	217.8	87-3600	6.50	38.3	CI	Mor	Als	Pur	AC	Str	NS	AL	AL	P.B&B	Own	Nb-UP	½ Own	4.10	IC
16	Ford.....V8-60	665‡	112	5.50/16	8-2.6x3.2	21.6	136.0	60-3500	6.60	30.7	AI	Dia	CS	No	Yes	Str	Own	O	Own	P	Own	m-Spi	¾ Own	4.44	Tr
17	Ford.....V8-85	705‡	112	6.00/16	8-3 1/16x3¾	30.0	221.0	85-3800	6.15	38.2	CI	Dia	CS	No	Yes	Str	Own	O	Own	P.Os	Own	m-Spi	¾ Own	3.78	Tr
18	Graham Spec.&Cus.96	965	120	6.00/16	6-3¼x4 3/8	25.3	217.8	90-3600	6.50	36.8	CI	LB	Als	No	AC	Mar	Old	DR	Wil	P.Long	WG	Nb-UP	½ Spi	4.27	C
19	Graham Sc.&Cus.Sc97	1095	120	6.25/16	6-3¼x4 3/8	25.3	217.8	116-4000	6.70	....	AI	LB	Als	Fram	AC	Mar	Old	DR	Wil	P.Long	WG	Nb-UP	½ Spi	4.27	C
20	Hudson 112....90-98	806	112	6.00/16	6-3x4 1/8	21.6	175.0	86-4000	6.50	33.3	CI	GED	Al	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C
21	Hudson-Six.....92	898	118	6.00/16	6-3x5	21.6	212.0	96-3900	6.25	38.1	CI	GED	Al	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C
22	Hudson-C.C.Six...93	995	122	6.25/16	6-3x5	21.6	212.0	101-4000	6.25	36.3	CI	GED	Al	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C
23	Hudson-C.C.8..95-97	1079	122, 129	6.50/16	8-3x4½	28.8	254.5	122-4200	6.25	40.9	CI	GED	Al	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C
24	Hupmobile...6 R-915	895	115	6.00/16	6-3½x4¼	29.4	245.3	101-3600	5.75	40.9	CI	Mor	Als	No	AC	Car	Old	AL	Wil	P.B&B	WG	m-Spi	½ Spi	4.27	C
25	Hupmobile Six..922E	995	122	6.25/16	6-3½x4¼	29.4	245.3	101-3600	5.75	41.8	CI	Mor	Als	No	AC	Car	Old	AL	Wil	P.B&B	WG	m-Spi	½ Spi	4.54	C
26	Hupmobile, 8...925H	1145	125	6.50/16	8-3 1/16x4¾	32.5	303.2	120-3500	5.80	43.2	CI	Mor	Als	No	AC	Car	Old	AL	Wil	P.Long	WG	m-UP	½ Spi	4.54	C
27	La Salle....V8, 39-50	1320	120	7.00/16	8-3 5/8x4½	36.4	322.0	125-3400	6.25	41.7	CI	Mor	Ala	No	AC	Car	Wal	DR	Del	P.Long	Own	Nb-Mec	½ Own	3.92	IC
28	Lincoln.....V12	.....	136-145	7.50/17	12-3 1/16x4½	46.8	414.0	150-3400	6.38	39.1	AI	Mor	Al	Pur	AC	Str	Old	AL	Exi	P.Long	Own	m-Spi	FF Tim	4.58	C
29	Lincoln-Zephyr.....	1360‡	125	7.00/16	12-2¾x3¾	36.3	267.0	110-3900	6.70	40.4	AI	Dia	CS	Fram	.....	Str	Old	O	Own	P	Own	m-Spi	¾ Own	4.44	Tr
30	Mercury.....8	934‡	116	6.00/16	8-3.187x3½	32.5	239.0	95-3600	6.15	36.9	CI	Dia	CS	.....	AC	Str	Own	O	Own	P.Os	Own	m-Spi	¾ Own	3.54	Tr
31	Nash Lafay.....3910	840	117	6.00/16	6-3 5/8x4 3/8	27.3	234.8	99-3400	6.30	37.6	CI	Whit	Als	No	AC	Str	Wal	AL	USL	P.B&B	Own	Nb-Mec	½ Own	4.10	C
32	Nash...Amb. 6, 3920	985	121	6.25/16	6-3 5/8x4 3/8	27.3	234.8	105-3400	6.00	35.6	CI	Whit	Als	BS	AC	Car	Wal	AL	USL	P.B&B	Own	Nb-Mec	½ Own	4.10	C
33	Nash...Amb. 8, 3980	1235	125	7.00/16	8-3 1/8x4¼	31.2	260.8	115-3400	6.00	34.9	CI	Dia	Als	BS	AC	Car	Wal	AL	USL	P.B&B	Own	Nb-Mec	½ Own	4.10	C
34	Oldsmobile.....60	889	115	6.00/16	6-3 1/16x3 7/8	28.4	216.0	90-3200	6.20	39.3	CI	Whit	Ala	No	AC	Car	Var	DR	Del	P.B&B	Own	Rb-Mec	½ Own	4.30	IC
35	Oldsmobile.....70	952	120	6.00/16	6-3 1/16x4 1/8	28.4	229.7	95-3300	6.10	39.7	CI	Whit	Ala	No	AC	Car	Var	DR	Del	P.B&B	Own	Rb-Mec	½ Own	4.30	IC
36	Oldsmobile.....80	1043	120	6.50/16	8-3¼x3 7/8	33.8	257.1	110-3500	6.20	41.6	CI	LB	Ala	No	AC	Car	Var	DR	Del	P.B&B	Own	Rb-Mec	½ Own	4.30	IC
37	Overland-39.....	595‡	102	5.00/16	4-3 1/8x4 3/8	15.6	134.2	61-3600	6.35	35.0	CI°	LB	Al	F-O	AC	Til	Mac	AL	USL	P.Long	WG	m-UP	½ Own	4.30	C
38	Packard Six....1700	1095	122	6.50/16	6-3½x4¼	29.4	245.3	100-3200	6.52	40.1	CI	Mor	Als	Pur	Op	CG	Wal	DR	Wil	P	Own	Nb-Mec	½ Own	4.54	IC
39	Packard Eight.1701-2	1295	127, 148	7.00/16	8-3¼x4¼	33.8	282.0	120-3600	6.41	42.0	CI	Mor	Als	Pur	AC	Str	Wal	AL	PD	P	Own	Nb-Mec	½ Own	(b)	IC
40	Pack. Sup. 8..1703-5	2035	127, 148	7.00/16	8-3 7/8x5	32.5	320.0	130-3200	6.45	44.1	CI	Mor	Als	Pur	AC	Str	Wal	AL †	PD	P	Own	Nb-Mec	½ Own	(s)	IC
41	Pack. Twelve..1707-8	4155	134, 139	8.25/16	12-3 1/16x4¼	56.7	473.0	175-3200	6.30	44.1	AI	Mor	Als	Pur	AC	Str	Old	AL †	PD	P	Own	Nb-Spi	½ Own	4.41	IC
42	Plymouth.....P7	726	114	5.50/16	6-3 1/8x4 3/8	23.4	201.3	82-3600	6.70	36.0	CI°	Mor	Ala	No	AI	Car	NS	AL	Wil	P.B&B	Own	Nb-UP	½ Own	3.90	IC
43	Plymouth.....P8	791	114	6.00/16	6-3 1/8x4 3/8	23.4	201.3	82-3600	6.70	35.9	CI°	Mor	Ala	Pur	AI	Car	NS	AL	Wil	P.B&B	Own	Nb-UP	½ Own	4.10	IC
44	Pontiac 6.....39-25	866	115	6.00/16	6-3 1/16x4	28.3	222.7	85-3520	6.20	38.7	CI	Mor	CHI	No	AC	Car	Var	DR	Del	P.In	Own	Rb-Mec	½ Own	4.10	IC
45	Pontiac 6.....39-26	922	120	6.00/16	6-3 1/16x4	28.3	222.7	85-3520	6.20	36.9	CI	Mor	CHI	No	AC	Car	Var	DR	Del	P.In	Own	Rb-Mec	½ Own	4.30	IC
46	Pontiac 8.....39-28	970	120	6.50/16	8-3¼x3 3/4	33.8	248.9	100-3700	6.20	41.2	CI	Mor	CHI	No	AC	Car	Var	DR	Del	P.In	Own	Rb-Mec	½ Own	4.30	IC
47	Studebaker. Com. 9A	965	116½	6.00/16	6-3 1/8x4 3/8	26.3	226.0	90-3400	6.00	41.1	CI	Dia	Ly	Fram	AC	Str	Buf	AL	Wil	P.B&B	WG	Nb-Spi	½ Spi	4.55	IT
48	Studebaker. Pres. 5C	1110	122	6.50/16	8-3 1/16x4¼	30.0	250.4	110-3600	6.00	41.7	CI	Dia	Ly	Fram	AC	Str	Old	DR	Wil	P.In	WG	Nb-Spi	½ Spi	4.55	IT
49	Willys-48.....	555‡	100	5.50/16	4-3 1/8x4 3/8	15.6	134.2	48-3200	5.70	31.8	CI°	LB	CI	F-O	AC	Til	Buf	AL	USL	P.R-B	WG	m-UP	½ Own	4.10	C

ABBREVIATIONS—General

°—Others also
•—Measured on rim of Flywheel
(1)—22 on Ford V8, 21 on DeL. Ford V8.
½—Semi-floating
¾—Three-quarter floating
††—With clearance of .015 the valve is .004 off its seat.
‡—Does not include Federal Taxes
§—Computed on basis of displacement, gear ratio, effective tire diameter, and weight with normal load.
(a)—(−¼ to +¾)
A—Above (rods removed from)
A—After top center
AA—Automatic adjuster
Ad—Advanced Al—Aluminum
Ala—Aluminum, Anode processed
Als—Aluminum with struts
Au—Automatic
(b)—4.36-1701; 4.70-1702
B—Below (rods removed from)
B—Before top center
Bm—Before marks on vibration damper
(c)—1−1/8, 1−3/32 C—Conventional
C—Cold (Tappet clearance)
Ch—Chain
CHI—Chrome Nickel Iron
CI—Cast Iron CS—Cast Steel
CSM—Chain sproket markings
(d)—0+0−½ (e)—0+1/16−0
(f)—1/16±1/16−0
F—Floating (Piston Pin)
FF—Full floating
H—Hot (tappet clearance)
(i)—4900-5100 IC—Independent coil
IT—Independent Transverse
Ly—Lynite
m—Metal with anti-friction bearings
M—Mechanical N—Negative
Nb—Needle bearing
(nn)—N1¼ to N2¼ on 61, N1¼ to N1¼ on 60S
(np)—N¼ to +¾ on 61, N¼ to +½ on 60S
(nr)—5°6′ on 61, 5°44′ on 60S
p—Plain bearing
P—Piston (Pin locked in)
P—Single plate clutch
R—Rod (Pin locked in)
(r)—Out only Ru—Rubber
Rb—Roller bearing
(s)—4.36-1703, 4.54-1705
(t)—½±¾−0 TC—Top Center
Tr—Transverse Var—Various
x—At 1000 R.P.M.
y—At 2800 R.P.M.

Tune-Up Specifications

Car Manufacturers and Supersede All Others Previously Published

Service Brake Make and Type	Steering Gear Make	Compression Pressure at Cranking Speed (Lbs.)	Spark Plug Make and Type	RINGS No. and Width Comp.	RINGS No. and Width Oil	Piston Pin Diameter	Piston Pin Locked In	VALVES Head Diameter and Seat Angle Inlet (Ins.)	Inlet Seat Angle (Degrees)	Exhaust (Ins.)	Exhaust Seat Angle (Degrees)	Stem Diameter (Ins.)	Operating Tappet Clearance Inlet	Exhaust	Inlet Tappet Clearance for Valve Timing	Intake Valve Opens Before or After T.C. No. of Degrees	No. of Flywheel Teeth	IGNITION Breaker Points Gap (Ins.)	Spark Plug Gap (Ins.)	Timing Spark Occurs °TC	No. of Flyw. Teeth Spark Occurs TC	Breaker Housing	Rods Removed From	Crankpin Diameter (Ins.)	Crankpin Length (Ins.)	Capacity Crankcase (Qts.)	Capacity Cooling System (Qts.)	FRONT AXLE Caster (Degrees)	Camber (Degrees)	Toe-In (Inches)	King Pin Inclination (Degrees)	Line Number
OM	R	125	AL-A9	2-3/32	1-1/16	39/64	R	1 1/32	45	1 1/32	45	.279	.011H	.012H	.011	19B	4½B	.022	.025	TC	TC	Au	A	1 1/8	1¼	3	4	11	1¼	1/16-1/8	1½	1
OH	S	112	AC-46	2(c)	2-3/16	13/16	R	1 17/32	45	1 11/32	45	.372	.015H	.015H	††	13B	5¼B	.015	.025	4B	1½B	Au	A	2	1.21	6	13¼	N 1/16 ± 3/32	-¼, +1	0-1/16	3½-4½	2
OH	S	114	AC-46	2(c)	2-3/16	13/16	R	1 17/32	45	1 7/16	45	.372	.015H	.015H	††	14B	6B	.015	.025	6B	2½B	Au	A	2¼	1.31	8	17	N 1/16 ± 3/32	-¼, +1	0-1/16	3½-4½	3
OH	S	114	AC-46	2(c)	2-3/16	7/8	R	1 17/32	45	1 7/16	45	.372	.015H	.015H	††	14B	6B	.015	.025	6B	2½B	Au	A	2¼	1.31	8	17	N 1/16 ± 3/32	-¼, +1	0-1/16	4½-5½	4
OH	S	114	AC-46	2(c)	2-3/16	7/8	R	1 17/32	45	1 7/16	45	.372	.015H	.015H	††	14B	6B	.015	.025	6B	2½B	Au	A	2¼	1.31	8	17	N 1/16 ± 3/32	-¼, +1	0-1/16	4-5	5
BH	S	155x	AC-104	2(c)	2-5/32	7/8	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2¼B	Au	A	2.46	2½	7	25	(nn)	(np)	1/32-3/32	(nr)	6
BH	S	170x	AC-104	2(c)	2-5/32	7/8	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2¼B	Au	A	2.46	2½	7	25	0-±¼	0-½	1/32-3/32	5° 1′	7
BH	S	180x	AC-104	2(c)	1-3/16	13/16	R	1.50	45	1.37	45	.341	AA	AA	AA	6B	2½B	.015	.032	6B	2½B	Au	A	2	1¾	11	30	0-±¼	0-½	1/32-3/32	5° 1′	8
OH	O	.....	AC-46	2-1/8	1-3/16	.865	R	1 13/64	30	1 15/32	30	.340	.006H	.013H	.006	9B	3½B	.021	.040	5B	2B	Au	A	2 1/16	1 1/16	5	14	2¼±½	1±½	3/4-1/8	7°10′	9
OH	O	.....	AC-46	2-1/8	1-3/16	.865	R	1 13/64	30	1 15/32	30	.340	.006H	.013H	.006	9B	3½B	.021	.040	5B	2B	Au	A	2 1/16	1 1/16	5	14	0±½	N ¼ ± ½	0-1/16	4¾	10
LH	G	145x	AL-A7	2-1/8	2-3/32	55/64	F	1 31/32	45	1 17/32	45	.340	.010H	.010H	.014	8B	3½B	.020	.025	TC	TC	Au	A	2 1/16	1 7/32	5	17	½-2½	(a)	0-1/8	4¾-6	11
LH	G	155x	AL-A7	2-1/8	2-3/32	55/64	F	1 31/32	45	1 15/32	45	.340	.008H	.010H	.011	6B	2½B	.018	.025	TC	TC	Au	A	2 3/16	1 1/8	6	24	N ¼ + 1½	-¼ to + ½	0-1/8	5¾-7	12
LH	G	155x	AL-AL6	2-1/8	2-3/32	55/64	F	1 31/32	45	1 13/32	45	.340	.008H	.010H	.011	6B	2½B	.018	.025	3B	1¼B	Au	A	2 3/16	1 1/8	6	24	1-3	-¼ to + ½	0-1/8	4¾-6	13
LH	G	145x	AL-A7	2-1/8	2-3/32	55/64	F	1 31/32	45	1 13/32	45	.340	.008H	.010H	.014	8B	3¼B	.020	.025	2B	3/4B	Au	A	2 1/8	1 7/32	5	19	½-2½	(a)	0-1/8	4¾-6	14
LH	G	140x	AL-A7	2-1/8	2-3/32	55/64	F	1 15/32	45	1 15/32	45	.340	.006H	.008H	.011	6A	2½A	.020	.025	TC	TC	Au	A	2 1/16	1	5	15	N ½, + 1½	N ¼ — + ½	0-1/8	5¼-6½	15
LH	G	150y	Ch-H-10	2-3/32	1-5/32	.687	F	1.28	45	1.28	45	.279	.013C	.013C	.013	9½B	3¼B	.015	.025	4B	1½B	Au	..	1.60	1.54	4	15	8	1	1/16	8	16
LH	G	100	Ch-H-10	2-3/32	1-5/32	.750	F	1 17/32	45	1 17/32	45	.310	.013C	.013C	.013	TC	TC	.015	.025	4B	1½B	Au	A	2	1.75	5	(1)	8	1	1/16	8	17
OH	R	120	Ch-H-10	2-3/32	2-5/32	13/16	R	1 23/64	30	1 21/64	45	.341	.010H	.010H	.012	4½B	1½B	.018	.025	TC	TC	Au	A	2 1/16	5/8	5	14	3-4	1	1/8-3/16	7½	18
OH	R	130	Ch-H-10	2-3/32	2-5/32	13/16	R	1 23/64	30	1 21/64	45	.341	.010H	.010H	.012	4½B	1½B	.018	.025	4½A	1½A	Au	A	2 1/16	1 1/16	5	15	3-4	1	1/8-3/16	7½	19
BH	G	115	Ch-J-8	2-3/32	2-3/16	3/4	F	1 3/8	45	1 3/8	45	11/32	.006H	.008H	.010	10°3B	3B	.020	.032	2½B	9¼B	Au	A	1 13/16	1 3/8	4½	12½	1½±½	1-1½	0-1/8	7	20
BH	G	120	Ch-J-8	2-3/32	2-3/16	3/4	F	1 3/8	45	1 3/8	45	11/32	.006H	.008H	.010	10°3B	3B	.020	.032	TC	TC	Au	A	1 13/16	1 3/8	4½	12½	1½±½	1-1½	0-1/8	7	21
BH	G	120	Ch-J-8	2-3/32	2-3/16	3/4	F	1 3/8	45	1 3/8	45	11/32	.006H	.008H	.010	10°3B	3B	.020	.032	TC	TC	Au	A	1 13/16	1 3/8	4½	12½	1½±½	1-1½	0-1/8	7	22
BH	G	118	Ch-J-8	2-3/32	2-3/16	3/4	F	1½	45	1 3/8	45	11/32	.006H	.008H	.010	10°3B	3B	.017	.032	TC	TC	Au	A	1 1/16	1 3/8	7	17.2	1½±½	1-1½	0-1/8	7	23
LH	G	107	Ch-7	2-1/8	2-5/32	7/8	F	1 31/32	45	1 17/32	45	.341	.010	.014	.013	2B	½B	.022	.028	7B	2¼B	..	A	2 1/8	1¼	6	18	1½	1	1/16-3/16	7½	24
LH	G	107	Ch-7	2-1/8	2-3/32	7/8	F	1 31/32	45	1 17/32	45	.341	.010	.013	.014	2B	½B	.022	.028	7B	2¼B	Au	A	2 1/8	1¼	6	18	1½	1	1/16-3/16	7½	25
LH	G	113	Ch-7	2-1/8	2-3/32	7/8	F	1 15/32	45	1 13/32	45	.341	.006	.013	.010	1B	½B	.015	.028	7B	2B	Au	B	2¼	1¼	8	21.5	1½	1¼	1/16-3/16	8½	26
BH	S	155x	AC-104	2(c)	2-5/32	7/8	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2¼B	Au	A	2 1/32	2 1/32	7	.....	N¼-N2¼	0-¾	1/32-3/32	5° 6′	27
OM	O	105	Ch-7	2-1/8	2-5/32	7/8	F	1 11/16	45	1 11/16	45	1/8	AA	AA	AA	21B	6¾B	.020	.029	7B	2¼B	Au	B	2½	2	12	32	1½	1	1/16-1/8	7½	28
BH	G	105	Ch-H-10	2-3/32	1-5/32	3/4	F	1 1/32	45	1 1/32	45	.311	AA	AA	AA	19½B	6B	.015	.029	4B	1¼B	Au	A	2 1/8	1.57	5	30	4	¾	1/16	4	29
BH	G	....	Ch-H-10	2-3/32	1-5/32	3/4	F	1 1/32	45	1 1/32	45	.310	.013C	.013C	.013	TC	TC	.015	.025	4B	1¼B	Au	A	2.14	1.75	5	21	8	1	1/16	8	30
BH	G	110	AL-B7-A	2-1/8	2-5/32	7/8	F	1 31/32	45	1 17/32	45	.340	.015	.015	.015	21½B	6B	.020	.025	TC	TC	Au	A	2	1.42	6	20	1-2	0-1½	0-1/16	7	31
BH	G	125	AC-45	2-1/8	2-5/32	7/8	F	1¾	45	1 19/32	45	.372	.015	.015H	.015	24½B	7B	.020	.025	6B	½B	Au	A	2	1.42	6	16	1-2	0-1½	0-1/16	7	32
BH	G	110	AC-45	2-1/8	1-1/8 1-3/16	7/8	F	1 31/32	45	1 15/32	45	.372	.015H	.015H	.015	20B	6B	.020	.025	9B	3/4B	Au	B	2	1.24	7	17	1-2	0-1½	0-1/16	7	33
BH	S	151x	AC-45	2-3/32	2-3/16	55/64	P	1 1/8	30	1 27/64	45	11/32	.008H	.011H	.011	5B	2B	.020	.040	TC	TC	Au	A	2 1/16	1 3/8	5	17	0-N¾	1/8-1	1/16-3/16	4° 51½′	34
BH	S	146x	AC-45	2-3/32	2-3/16	55/64	P	1 1/8	30	1 27/64	45	11/32	.008H	.011H	.011	5B	2B	.020	.040	TC	TC	Au	A	2 1/16	1 3/8	5	17	0-N¾	1/8-1	1/16-3/16	4° 51½′	35
BH	S	152x	AC-45	2-3/32	2-3/16	55/64	P	1 1/8	30	1 27/64	45	11/32	.008H	.011H	.011	TC	TC	.015	.030	2B	¾B	Au	A	2 1/16	1 3/8	6	24	0-N¾	1/8-1	1/8-3/16	4° 51½′	36
LH	G	105	Ch-J-8	2-3/32	1-3/16	13/16	R	1 17/32	45	1 15/32	45	.373	.014C	.014C	.020	9B	2½B	.020	.025	TC	TC	Au	A	1 13/16	1 1/8	4	11¾	3	2	1/16-1/8	7½	37
H	O	110	AC-103 (z)	2-1/16	1-3/16	7/8	F	1.57	30	1 13/32	45	.340	.007H	.010H	.012	1B	½B	.020	.028	6B	2½B	Au	A	2 3/32	1¼	5	15	1½±½	(t)	(e)	1° 54′	38
H	O	110	AC-103 (z)	2-1/16	1-3/16	7/8	F	1 17/32	30	1 13/32	45	.340	.007H	.010H	.012	1B	½B	.015	.028	8B	3B	Au	A	2 3/32	1¼	6	16	1½±½	(t)	(e)	1° 54′	39
BPH	O	110	AC-103 (z)	3-1/16	1-3/16	7/8	F	1 41/64	45	1 31/64	45	.340	.006H	.008H	.005	26B	10½B	.015	.028	7B	3B	Au	B	2 3/16	1 3/32	7½	22	0±½	(t)	(e)	1° 54′	40
LH	G	145x	Ch-J-8	2-1/8	2-5/32	55/64	F	1 15/32	45	1 15/32	45	.340	.006H	.008H	.011	6A	2½A	.020	.025	TC	TC	Au	A	1 15/16	1	5	14	N ½, + 1½	-¼ to + ½	0-1/8	5½-6½	42
LH	G	145x	AL-A-7	2-1/8	2-3/32	55/64	F	1 15/32	45	1 15/32	45	.340	.006H	.008H	.011	6A	2½A	.020	.025	TC	TC	Au	A	1 15/16	1	5	14	N ½, + 1½	-¼ to + ½	0-1/8	5½-6½	43
BH	S	141x	AC-45	2-3/32	1-3/16	13/16	P	1 19/32	30	1 15/32	45	.310	.012H	.012H	.015	5B	2B	.021	.025	1-3B	1½B	Au	A	2 1/8	1 3/32	6	17	N ½-N1	½-1	0-1/16	4° 51′	44
BH	S	141x	AC-45	2-3/32	1-3/16	13/16	P	1 15/32	30	1 15/32	45	.310	.012H	.012H	.015	5B	2B	.021	.025	1-3B	1½B	Au	A	2 1/8	1 3/32	6	17	N ½-N1	½-1	0-1/16	4° 51′	45
BH	S	141x	AC-45	2-3/32	1-3/16	13/16	P	1 15/32	30	1 13/32	45	.310	.012H	.012H	.015	5B	2B	.015	.025	1-3B	1½B	Au	A	2	1 1/16	7	19	N ½-N1	½-1	0-1/16	4° 51′	46
LH	R	105	Ch-8	2-1/8	1-3/16	7/8	R	1 15/32	45	1 9/32	45	11/32	.016C	.016C	.020	15B	5½B	.020	.025	2B	3/4B	Au	A	2 3/16	1 3/8	6	14½	N ½, + ½	½	1/16-1/8	5½	47
LH	R	105	Ch-8	2-1/8	1-3/16	7/8	R	1 15/32	45	1 9/32	45	11/32	.016C	.016C	.020	15B	5½B	.020	.025	TC	TC	Au	A	1 7/8	1 1/16	8	17	N ½, + ½	½	1/16-1/8	5½	48
BM	G	87	Ch-C7	3-3/32	1-3/16	15/16	F	1 17/32	45	1 15/32	45	.371	.004H	.006H	.010	TC	TC	.020	.025	5A	1½A	Au	A	1 13/16	1 1/16	4	11	3	2	3/32	7½	49

MAKES OF UNITS

†—Starter Motor—Owen-Dyneto
AC—AC Spark Plug Co.
AI—AC and Industrial Wire Cloth Products.
AL—Auto-Lite
BC—Carter and Chandler-Groves
B&B—Borg and Beck
BH—Bendix, Hydraulic
BM—Bendix, Mechanical
BPH—Bendix, power operated, hydraulic **BS**—Briggs & Stratton
Buf—Buffalo Pressed Steel
Car—Carter
Ch—Champion **Del**—Delco
Dia—Continental Diamond Fiber
Det—Detroit **Exi**—Exide
Don—Donaldson Simplex
DR—Delco-Remy **G**—Gemmer
F-O—Float-o.
Ge—General Electric Co.
GED—General Electric or Continental Diamond Fiber
In—Inland **LB**—Link Belt
LH—Lockheed hydraulic
Ly—Lynite
Mac—MacKenzie Muffler Co.
Mar—Marvel
Mec—Mechanics
Mor—Morse Chain Co.
Nat—National
NS—Noblitt Sparks
O—Own **OH**—Own hydraulic
Old—Oldberg
OM—Own, mechanical
Op—Optional
Os—Own, semi-centrifugal
PD—Prest-O-Lite or Delco
Pur—Purolator
R—Ross
R-B—Rockford with Borg & Beck disk
Ro—Rockford
S—Saginaw
Spi—Spicer **Ste**—Stewart-Warner
Str—Stromberg
Th—Thompson Products
Til—Tillotson
UP—Universal Products
Wal—Walker
WG—Warner Gear
Whit—Whitney **Wil**—Willard
(z)—Or Champion **Y—4**

Motor Car Price, Weight and Body Table

Following are delivered prices at factory for cars with standard equipment and include all federal taxes with exception of Ford, Lincoln, Lincoln-Zephyr, Mercury, Overland and Willys. Optional equipment, state or local taxes, transportation charges and finance charges are extra.

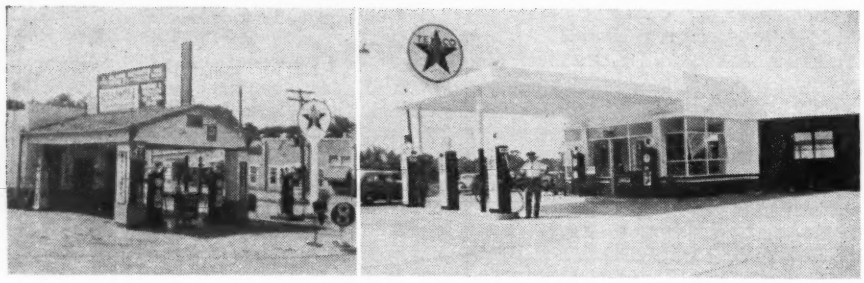
BODY, MAKE AND MODEL	Delivered Price	Shipping Weight
BANTAM		
Spec. Coupe	399	1250
Std. Coupe	439	1250
Spec. Roadster	449	1200
Pickup Truck	465	1245
DeLuxe Coupe	469	1265
Std. Roadster	479	1200
Panel Truck	479	1330
Std. Touring, 4p	497½	1270
Std. Del.	497½	1265
DeL. Roadster	525	1200
DeL. Del.	549	1265
DeL. Touring, 4p	549	1270
Stat. Wagon	565	1400
BUICK		
Series 40		
Bus. Coupe	894	3322
Sport Coupe	950	3372
Tour. Sedan, 2d.	955	3417
Tour. Sed., 4d.	996	3482
Conv. Coupe	1077	3452
Sport Phaeton	1406	3642
Series 60		
Sport Coupe	1175	3637
Tour. Sed., 2d.	1205	3707
Tour. Sed., 4d.	1246	3782
Conv. Coupe	1343	3712
Spt. Phae., Tr.	1713	3917
Spt. Phaeton	1983	
Series 80		
Tr. Sd., trk., 4d.	1543	4247
Sport Sedan, 4d.	1543	
Formal Sed., 4d.	1758	4312
Sport Phae., 4d.	1983	4392
Series 90		
Tr. Sd., 4d, 6p	2074	4568
Tr. Sd., 4d, 8p	2350	4608
Limo., 4d, 8p	2453	4653
CADILLAC		
Series 61		
Coupe	1610	3685
Sedan, 4d	1680	3770
Conv. Coupe	1770	3765
Conv. Sedan	2170	3810
Series 60-S		
Tour. Sedan, 5p	2090	4110
Series 75		
Tour. Sedan, 5p	2995	4785
Bus. Tr. Sed., 8p	3105	4865
Tour. Sed. Div.	3155	4845
Tour. Sedan, 7p	3210	4865
Tour. Imp., 7p	3260	5025
Coupe, 2p	3280	4595
Tour. Sedan, 7p	3360	4865
Coupe, 3-5p	3380	4695
Conv. Coupe, 2p	3380	4675
Town Sedan, 5p	3635	4820
Conv. Sed., Trk.	3945	5030
Formal Sed., 5p.	3995	4785
Formal Sed., 7p.	3995	5025
Town Car, 7p	5115	5095
Series 90		
Sedan, 5p	5140	5105
Tour. Sed. Div.	5215	5165
Tour. Sedan, 7p	5270	5185
Coupe, 2p	5340	4915
Imp. Tr. Sed., 7p	5420	5345
Coupe, 5p	5440	5015
Conv. Coupe	5440	4995
Town Sedan, 5p	5695	5140
Conv. Sed., Trk.	6000	5350
Formal Sed., 5p.	6055	5105
Formal Sed., 7p.	6055	5345
Town Car, 7p	7175	5415
CHEVROLET		
Master 85		
Bus. Coupe	628	2780
Coach, 2d	648	2795
CHEVROLET (Cont.)		
Town Sedan, 2d.	669	2820
Sedan, 4d	689	2805
Sport Sedan, 4d.	710	2845
Master De Luxe		
Bus. Coupe	684	2845
Coach, 2d	699	2865
Coupe, 2-4p	715	2845
Town Sedan, 2d.	720	2875
Sedan, 4d	745	2875
Sport Sedan, 4d.	766	2910
CHRYSLER		
Royal Six		
Coupe	918	3120
Vict. Coupe	970	3160
Brougham	975	3200
Sedan	1010	3265
Sedan, 7p	1235	3520
Limousine	1325	3605
Royal Windsor Six		
Coupe	983	3130
Vict. Coupe	1035	3165
Club Coupe	1185	
Sedan	1075	3275
Imperial Eight		
Coupe	1123	3520
Vict. Coupe	1160	3555
Brougham	1165	3610
Sedan	1198	3640
New Yorker Imp. 8		
Coupe	1223	3540
Vict. Coupe	1260	3580
Club Coupe	1395	
Sedan	1298	3695
Saratoga Imp. 8		
Sedan	1443	3720
Club Coupe	1495	
Custom Imp. 8		
Sedan	2595	4590
Sedan, 7p	2595	4620
Limousine	2695	
DE SOTO		
De Luxe		
Bus. Coupe	870	3064
Coupe, 2-4p	925	3089
Tour. Sedan, 2d.	930	3129
Tour. Sedan, 4d.	970	3174
Tour. Sedan, 7p.	1195	3454
Limousine, 7p	1285	3549
Custom		
Coupe	923	3069
Coupe, 2-4p	978	3094
Tour. Sedan, 2d.	983	3134
Tour. Sedan, 4d.	1023	3179
Tour. Sedan, 7p.	1248	3459
Limousine, 7p	1338	3554
DODGE		
Special		
Coupe	756	2895
Sedan, 2d	815	2935
Sedan, 4d	855	2960
De Luxe		
Coupe	803	2940
Coupe, 2-4p	860	2970
Sedan, 2d	865	3020
Sedan, 4d	905	3045
Sedan, 7p	1095	3420
Limousine	1185	
FORD		
V8-60		
Coupe	580	2360
FORD (Cont.)		
Tudor Sedan	620	2510
Fordor Sedan	665	2525
V8-85		
Coupe	620	2610
Tudor Sedan	660	2725
Fordor Sedan	705	2750
De Luxe 85		
Coupe	680	2650
Tudor Sedan	720	2765
Fordor Sedan	765	2795
Conv. Coupe	765	2735
Conv. Sedan	895	2830
GRAHAM		
Special 96		
Comb. Coupe	940	
Sedan, 2d	940	
Sedan, 4d	965	3240
Custom 96		
Comb. Coupe	1070	
Sedan, 2d	1070	
Sedan, 4d	1095	3240
Sup'charger 97		
Comb. Coupe	1070	
Sedan, 2d	1070	
Sedan, 4d	1095	3240
Custom Sup'charger 97		
Comb. Coupe	1200	
Sedan, 2d	1200	
Sedan, 4d	1225	3240
HUDSON		
112-90		
Coupe, 3p	745	2587
Vict. Coupe	791	2622
Tour. Brougham.	775	2682
Tour Sedan	806	2712
Conv. Coupe	886	2627
Conv. Brougham.	936	2732
112-98		
Tour. Sedan	884	
Six-92		
Coupe, 3p	823	2757
Vict. Coupe	869	2787
Tour. Brougham.	856	2847
Tour. Sedan	898	2897
Conv. Coupe	972	2782
Conv. Brougham.	1032	2892
Country Club Six-93		
Coupe, 3p	919	2848
Vict. Coupe	967	2893
Tour. Brougham.	960	2968
Tour. Sedan	995	3023
Conv. Coupe	1052	2898
Conv. Brougham.	1115	2983
Country Club Eight-95		
Coupe, 3p	1009	3003
Vict. Coupe	1051	3053
Tour. Brougham.	1049	3138
Tour. Sedan	1079	3193
Conv. Coupe	1138	3033
Conv. Brougham.	1201	3123
Country Club Eight-97		
Tour. Sedan	1174	3268
HUPMOBILE		
Skylark—R915		
Sedan, 5p, 4d	895	
Sedan, 5p, 4d	975	
Sedan, 5p, 4d	1075	
Cabriolet	1145	
Big Six-922E		
De Luxe Sedan	995	3400
Custom Sedan	1095	3440
Eight-925H		
De Luxe Sedan	1145	4085
Custom Sedan	1245	4215
LA SALLE		
Coupe	1240	3635
Sedan, 2d	1280	3710
Sedan, 4d	1320	3740
Conv. Coupe	1395	3715
Conv. Sedan	1800	3780
LINCOLN		
V-12—136 in.	wb.	
Sedan, 5p., 2w.	4800	5735
Sedan, 5p., 3w.	4800	5740
Conv. Road.LeB.	5200	5505
Coupe, LeB.	5200	5435
Brunn Conv.Vict.	5800	5530
Wilby.Coupe, 5p.	5800	5800
V-12—145 in.	wb.	
Sedan, 7p.	5000	6075
Limousine, 7p.	5100	6165
Conv.Sed.LeB.	5700	5855
Conv.Sed.LeB.	5900	5960
Jud. Berline, 2w.	5900	5770
Jud. Berline, 3w	6000	5840
Wilby. Limo.	6100	6140
Jud. Sed. Limo.	6200	5950
Brunn Cabriolet	6800	6010
Brunn Cabriolet	6900	6030
Brunn Brougham	6900	6120
Wilby.Spt.Sed.5p	6900	6030
Brunn Tour. Cab.	7100	6055
LINCOLN-ZEPHYR		
Standard		
Coupe	1320	3520
Coupe Sed., 2d.	1330	3600
Sedan, 4d.	1360	3620
Conv. Coupe	1700	3790
Conv. Sedan	1790	3900
Custom		
Coupe	1450	3520
Coupe Sedan	1480	3600
Sedan, 4d.	1510	3620
Limousine	1700	3670
MERCURY 8		
Sedan, 2d.	890	2885
Sed. Coupe, 2d	930	2885
Town Sedan, 4d.	930	2900
Sport Conv.	990	2880
NASH		
Nash-La Fayette Special		
Bus. Coupe	770	3205
Sedan, 2d	810	3255
Sedan, 4d	840	3290
Sedan, 4d, trk	840	3285
De Luxe		
Bus. Coupe	825	3270
Vict. Sedan, 2d.	855	3320
A. P. Coupe	860	3260
Sedan, 4d	885	3350
Sedan, 4d, trk.	885	3350
Conv. Coupe	950	
NASH (Cont.)		
Ambassador Six		
Bus. Coupe	925	
Vict. Sedan, 2d	955	
A. P. Coupe	960	
Sedan, 4d	985	3450
Sedan, 4d. trk.	985	3470
Conv. Coupe	1050	
Ambassador Eight		
Bus. Coupe	1175	
Vict. Sedan, 2d	1205	
A. P. Coupe	1210	
Sedan, 4d	1235	3800
Sedan, 4d, trk.	1235	
Conv. Coupe	1295	
OLDSMOBILE		
Six-Series 60		
Bus. Coupe	777	2870
Club Coupe	833	2915
Sedan, 2d	838	2965
Sedan, 4d	889	3000
Six-Series 70		
Bus. Coupe	840	3040
Club Coupe	891	3080
Sedan, 2d	901	3140
Sedan, 4d	952	3180
Conv. Coupe	1045	3230
Eight-Series 80		
Bus. Coupe	920	3190
Club Coupe	971	3230
Sedan, 2d	992	3290
Sedan, 4d	1043	3340
Conv. Coupe	1119	3390
OVERLAND		
Standard 39		
Coupe	560	2137
Sedan, 2d	580	2217
Sedan, 4d	595	2249
De Luxe		
Coupe	610	2193
Sedan, 2d	630	2262
Sedan, 4d	655	2306
PACKARD		
Six-1700		
Bus. Coupe	1000	3295
Club Coupe	1045	3365
Tour. Sedan, 2d	1065	3390
Tour. Sedan, 4d	1095	3400
Conv. Coupe	1195	3385
Eight-1701		
Bus. Coupe	1200	3490
Club Coupe	1245	3535
Tour. Sedan, 2d	1265	3595
Tour. Sedan, 4d	1295	3605
Conv. Coupe	1390	3545
Conv. Sedan	1700	3780
Eight-1702		
Tour. Sedan	1805	4100
Tour. Limo.	1955	4185
Super Eight-1703		
Club Coupe	1955	3860
Tour. Sedan, 4d	2035	3930
Conv. Coupe	2180	3870
Conv. Sedan	2435	4005
Super Eight-1705		
Tour. Sedan	2460	4425
Tour. Limo.	2600	4510
PACKARD (Cont.)		
Twelve-1707		
Coupe, 2-4p	4140	5400
Tour. Sedan, 4d	4155	5670
Coupe, 5p	4185	5425
Club Sedan	4255	5590
Conv. Cpe., 2-4p.	4375	5540
Formal Sedan	4865	5745
Victoria	5230	5570
A-W Cabriolet	6730	4950
Twelve-1708		
Tr. Sed., 4d, 7p	4485	5750
Tr. Limo., 4d, 7p	4690	5825
Conv. Sedan	5395	5890
A-W Town Car	6880	5075
Brunn Tr. Cab.	8355	5845
Brunn A-W Cab.	8355	5845
PLYMOUTH		
Roadking—P-7		
Coupe	645	2724
Sedan, 2d	685	2824
Tr. Sed., trk., 2d	699	2824
Sedan, 4d	726	2839
Tour. Sed., 4d	740	2829
De Luxe—P-8		
Coupe	725	2789
Coupe, 2-4p	755	2874
Sedan, 2d	761	2889
Tour. Sedan, 2d	775	2894
Sedan, 4d	791	2909
Tour. Sedan, 4d	805	2919
Conv. Coupe	895	3044
Sedan, 7p	1005	3374
Conv. Sedan	1150	3209
PONTIAC		
Quality Six		
Coupe	758	2875
Sport Coupe	809	2920
Tour. Sedan, 2d	820	2965
Tour. Sedan, 4d	866	3000
De Luxe Six		
Coupe	814	3020
Sport Coupe	865	3055
Tour. Sedan, 2d	871	3115
Tour. Sedan, 4d	922	3165
Conv. Coupe	993	3155
De Luxe Eight		
Coupe	862	3115
Sport Coupe	913	3165
Tour. Sedan, 2d	919	3225
Tour. Sedan, 4d	970	3265
Conv. Coupe	1046	3250
STUDEBAKER		
State Commander		
Bus. Coupe, 3p	875	3045
Cust. Cpe., 3p	900	3080
Club Sedan	955	3160
Cruising Sedan	965	3200
Conv. Sedan	1290	3415
State President		
Custom Coupe	1035	3300
Club Sedan	1100	3390
Cruising Sedan	1110	3440
Conv. Sedan	1460	3640
WILLYS		
Standard 48		
Coupe	495	2181
Sedan, 2d	535	2258
Sedan, 4d	555	2300

Truck Tune-Up Specifications

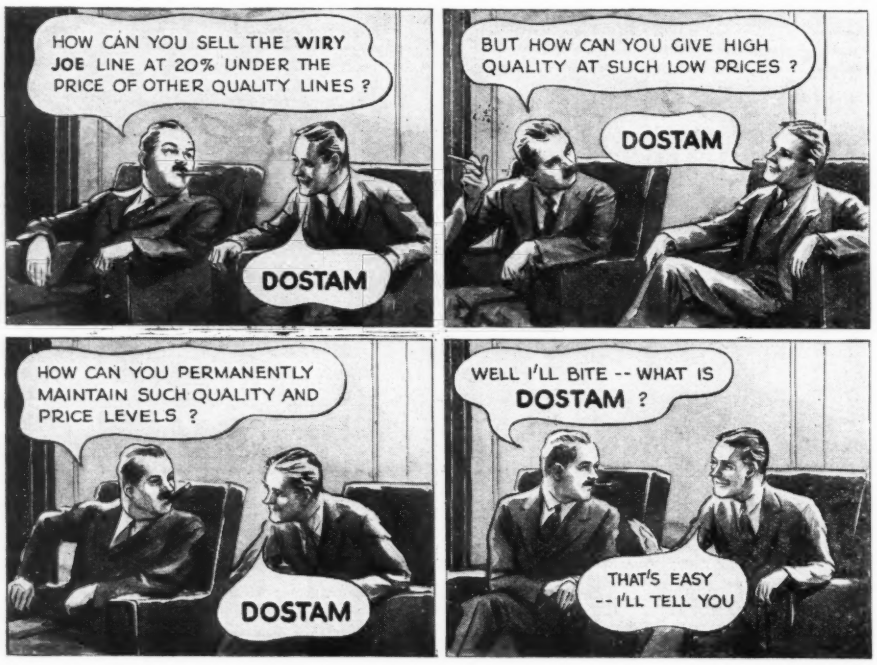
TRUCK MAKE AND MODEL	Engine Make and Model	Number of Cylinders Bore and Stroke	Connecting Rods Removed From	Intake Valve Opens °TC B—Before A—After	Intake Tappet Clearance for Valve Timing	Operating Tappet Clearance		Spark Plug Gap	Breaker Point Gap	Spark Occurs °TC B—Before A—After	Compression Pressure at Cranking Speed
						Intake	Exhaust				
AUTOCAR											
A, UA	Her JXB	6-3 5/16x4 1/4	Top	2°A	.010	.006	.006	.021	.020	TC	95
B, UB	Her JXC	6-3 3/4x4 1/4	Top	2°A	.010	.006	.006	.021	.020	TC	95
RM, RMT	Own 315	6-3 3/4x4 3/4	Top	TC	.020	.015	.018	.021	.021	8½°B	98
D, DP, 1TR, 1UTR, RL, RLD, RLS, UD, UDP, 6X2RL, 6X2UD	Own 358	6-4x4 3/4	Top	TC	.020	.015	.018	.021	.021	8½°B	98
DF, DH, N, NFS, 2TR, UDF, UN, UNFS, 2UTR, 4X4DF, 4X4N, 6X2DF, 6X4DF, 6X2UN	Own 404	6-4 1/4x4 3/4	Top	TC	.020	.015	.018	.021	.020	2°B	95
NF, CE, TS, 3TR, 4TR, S, UNF, UTS, 3UTR, 4UTR, US, 4X4NF, 6X2NF, 6X2UNF	Own 453	6-4 1/2x4 3/4	Top	TC	.020	.015	.018	.021	.020	2°B	95
T, 5TR, C, UT, 5UTR, 4X4S, 6X2T, 6X4TO, 6X4TD, 6X4TC, 6X2UT, 6X4UTO, 6X4UTD	Own 501	6-4 1/4x5 1/4	Top	TC	.020	.015	.018	.021	.020	2°B	95
BANTAM	Own	4-2.2x3	Top	19°B	.006	.006	.006	.025	.022	2°B	90
BROCKWAY											
94	Con 25B	6-3 1/16x4 1/8	Bot	5°B	.012	.008	.010	.025	.020	5°B	95
96, 110, 130	Con 29B	6-3 1/16x4 1/2	Bot	8°B	.015	.012	.012	.025	.020	8½°B	90
125X, 145	Con 31B	6-3 7/16x4 1/2	Bot	8°B	.015	.012	.012	.025	.020	8½°B	90
150X4, 150X5, 160X, 165X	Con 32B	6-4 1/16x4 1/2	Bot	8°B	.015	.012	.012	.025	.020	8½°B	90
170X, 195X	Con 33B	6-4 1/16x4 1/8	Bot	5°B	.014	.012	.015	.025	.020	15°B	82
175X, 220X	Con 34B	6-4 5/16x4 1/8	Bot	5°B	.014	.012	.015	.025	.020	15°B	82
240X, 260X	Con 35B	6-4 1/16x5 1/4	Bot	5°B	.014	.012	.015	.025	.020	15°B	82
112, 128	Con 38B	6-3 5/16x4 3/8	Bot	8°B	.015	.012	.012	.025	.020	8½°B	90
CHEVROLET											
HC, HD, HE, TA, TB	Own	6-3 1/16x3 3/4	Top	9°B	.....	.006	.013	.040	.018	5°B	.....
DIAMOND T											
80	Her QXB3	6-3 1/16x4 1/8	Top	5°A	.006	.006	.008	.027	.020	TC	*122
301, 304	Her QXC3	6-3 5/16x4 1/8	Top	5°A	.006	.006	.008	.027	.020	TC	*122
401, 402, 404, 405, 212-AS, 212-BS	Her JXA	6-3 5/16x4 1/4	Top	5°A	.006	.008	.010	.027	.020	TC	*120
221-S, 406, 507, 509, 244-S, 313, 611	Her JXB	6-3 5/16x4 1/4	Top	5°A	.006	.008	.010	.027	.020	TC	*121
320, 353, 607, 613	Her JXC	6-3 5/16x4 1/4	Top	5°A	.006	.008	.010	.027	.020	TC	*121
360, 609, 612, 614	Her JXD	6-4x4 1/4	Top	5°A	.006	.008	.010	.027	.020	TC	*115
412-DR, 512-B, 512-DR	Her WXLC3	6-4 1/16x4 3/4	Top	2°A	.010	.006	.010	.027	.020	TC	*103
DODGE											
RC, RD	Own 218 cu. in.	6-3 5/16x4 1/16	Top	TC	.014	.008	.012	.025	.020	TC	.....
RE	Own 218 cu. in.	6-3 5/16x4 1/16	Top	TC	.014	.008	.012	.025	.020	4°B	.....
RF	Own 228 cu. in.	6-3 7/16x4 1/4	Top	TC	.014	.008	.012	.025	.020	4°B	.....
RG, RH	Own 241 cu. in.	6-3 5/16x4 1/2	Top	TC	.014	.008	.012	.025	.020	6°B	.....
RL, RK, RO, RP	Own 323 cu. in.	6-3 3/4x5	Top	6°A	.011	.008	.012	.025	.020	6°B	.....
FEDERAL											
9	Con F4140	4-3 1/16x4 5/8	....	TC	....	.006	.008	.....	.020	TC	.....
10	Her OOB	4-3 3/4x4 1/2	Top	5°A	.008	.008	.012	.....	.020	TC	.....
11, 11H	Her QXB3	6-3 1/4x4 1/8	Top	....	....	.006	.008	.....	.020	TC	.....
15, 15H, 75, 75H	Her JXA	6-3 5/16x4 1/4	Top	5°A	.006	.008	.010	.025	.020	TC	.....
18, 18H, 20, 20H, 80, 80H	Her JXB	6-3 5/16x4 1/4	Top	5°A	.006	.008	.010	.025	.020	TC	.....
25, 25H, 85, 85H	Her JXC	6-3 5/16x4 1/4	Top	5°A	.006	.008	.010	.025	.020	TC	.....
29, 29H, 89, 89H	Her JXD	6-4x4 1/4	Top	5°A	....	.008	.010	.....	.020	TC	.....
40, 40DR	Wau 6MK	6-4 1/16x4 3/4	....	8°A	.004	.010	.012	.025	.020	TC	80
50, 50H	Wau 6MZ	6-4 1/4x4 3/4	....	8°A	.004	.010	.012	.025	.020	TC	80
C7, C7W, C8, C8W, C8H	Wau 6SRK	6-4 5/16x5 1/2	....	10°A	.004	.010	.012	.025	.020	TC	80
FORD											
81C, 81Y, 81T, 817T	Own	8-3 1/16x3 3/4	Top	TC	.013	.013C	.013C	.025	.015	4°B	100
82C, 82Y	Own	8-2.6x3.2	Top	9 1/2°B	.013	.013C	.013C	.025	.015	4°B	105
GENERAL MOTORS											
T14, T15, T145, T155	Own 223	6-3 7/16x4	Top	5°B	.013	.012	.012	.030	.021	5°B	.....
T16, T16H, F16, F16H	Own 230	6-3 7/16x4 1/8	Top	5°B	.008	.008	.011	.030	.021	TC	.....
T18, T18H, F18, F18H	Own 239	6-3 7/16x4 5/8	Top	4°B	.012	.013	.013	.035	.021	15°B	.....
T23, T23H, F23, F23H	Own 257	6-3 7/16x4 5/8	Top	4°B	.012	.013	.013	.035	.021	15°B	.....
T33, T33H, F33, F33H	Own 286	6-3 5/16x4 5/8	Top	4°B	.012	.013	.013	.035	.021	15.B	.....
T46, F46	Own 331	6-3 3/4x5	Bot	18°A	.012	.013	.013	.035	.020	15°B	.....
T61, T61H, F61, F61H	Own 400	6-4 1/2x5	Top	18°A	.012	.013	.013	.035	.020	15°B	.....
HUDSON-TERRAPLANE											
80, 88	Own	6-3x5	Top	11°B	.010	.006	.008	.032	.020	TC	103

TRUCK MAKE AND MODEL	Engine Make and Model	Number of Cylinders Bore and Stroke	Connecting Rods Removed From	Intake Valve Opens °TC B—Before A—After	Intake Tappet Clearance for Valve Timing	Operating Tappet Clearance		Spark Plug Gap	Breaker Point Gap	Spark Occurs °TC B—Before A—After	Compression Pressure at Cranking Speed
						Intake	Exhaust				
INTERNATIONAL											
D2, D15	Own HD213	6-3 1/16x4 1/16	Top	TC	.010	.010	.010	.023	.021	6°B	93
D5	Wau FC132	4-3 1/4x4	Top	.....	.010	.010	.010	.023	.021	.....	.....
D30, DS30, D30B, DS30B, D300, DS300, D186T, DS186T	Own HD232	6-3 1/8x4 1/2	Top	TC	.010	.010	.010	.023	.021	6°B	93
D35, DS35, D35B, D216T	Own FAB241	6-3 5/16x4 1/2	Top	.....	.....	.015	.015	.023	.021	.....	94
D40	Own FAB259	6-3 1/2x4 1/2	Top	.....	.....	.015	.015	.023	.021	.....	99
D50, D246T, D246F	Own FBB298	6-3 3/4x4 1/2	Top	.....	.....	.015	.015	.023	.021	.....	92
D60, DR60	Own FBB361	6-4 1/16x4 1/2	Top	.....	.....	.015	.015	.023	.021	.....	89
DR70, DR346T, D346F	Own FBB401	6-4 1/16x5	Top	.....	.....	.015	.015	.023	.021	.....	92
DR426F	Own FBB450	6-4 3/16x5	Top	.....	.....	.015	.015	.023	.021	.....	89
AR626F	Own FEB648	6-5x5 1/2	Top	.....	.....	.011	.013	.023	.021	.....	68
MACK, JR.											
2M4A	Own MR140	4-3 1/16x4 5/8	Top	TC	.012	.007	.010	.025	.020	6°B	90
2M6A, 2M6AS, 10MF, 11M	Own MR209	6-3 1/16x4 5/8	Top	2°B	.012	.007	.010	.025	.020	2°B	90
21M, 21MT	Own MR228	6-3 5/16x4 1/4	Bot	5°B	.012	.007	.008	.025	.020	8½°B	80
31M, 31MDR, 31MT	Own MR268	6-3 5/16x5	Bot	TC	.012	.007	.008	.025	.020	8½°B	80
MACK											
EE	Own FO	6-3 1/16x4 5/8	Top	6½°B	.017	.017	.017	.025	.020	3°B	105
EF	Own FM	6-3 5/16x4 5/8	Top	6½°B	.017	.017	.017	.025	.020	3°B	105
EJ	Own EJ	6-3 1/16x5	Bot	TC	.012	.008	.010	.025	.020	.....	.....
EH, ER, EM, EC	Own BG	6-3 5/16x5	Top	6°A	.012	.008	.024	.025	.020	7°B	89
BF, EQ, EB	Own CU	6-3 7/16x5	Top	6°A	.012	.008	.024	.025	.020	7°B	90
BM, CH	Own CE	6-4x5 1/2	Bot	10°A	.012	.008	.024	.025	.020	7°B	91
BX, FH, CJ	Own CF	6-4 1/16x5 1/2	Top	10°A	.012	.008	.024	.025	.020	7°B	91
BQ, AK, AC6	Own BQ	6-4 3/16x5 3/4	Top	10°A	.012	.008	.024	.021	.020	2°B	84
AC4	Own AC	4-5x6	Top	10°A	.012	.008	.024	.021	.020	TC	65
PLYMOUTH											
PT57	Own	6-3 1/16x4 5/8	Bot	6°A	.014	.006	.010	.025	.020	4°A	*145
REO											
450, 450L, 475, 475L	Own S140	4-3 1/16x4 5/8	Top	2°B	.....	.008	.012	.025	.020	6°B	.....
650, 650L, 675, 675L, 1A4, 1C4	Own S208	6-3 1/16x4 5/8	Top	TC	.....	.008	.012	.025	.020	2°B	.....
1L5	Own S209	6-3 1/16x4 5/8	Top	TC	.....	.007	.008	.025	.020	2°B	.....
1A4H, 1C4H, 1B4, 1D4, 1B7M	Own S228	6-3 5/16x4 1/4	Top	5°B	.....	.007	.008	.025	.020	8°B	.....
1B4H, 1D4H	Own S3L	6-3 5/16x5	Top	18°A	.....	.007	.008	.025	.020	6°B	.....
2B7M	Own	6-3 5/16x5	Top	5°B	.....	.007	.008	.025	.020	8°B	.....
2B4, 2D4, 2J5, 2H5, 2L7M, 31RHA-B	Own S3	6-3 5/16x5	Top	TC	.....	.007	.008	.025	.020	8°B	.....
2L4	Own S3	6-3 5/16x5	Top	TC	.....	.008	.012	.025	.020	8°B	.....
2L4H, 2L7MH, 3H5, 3J5, 3K5, 3HR5, 3JR5, 3KR5	Own S5	6-3 5/16x5	Top	TC	.....	.007	.008	.025	.020	8°B	.....
4H5, 4J5, 4K5, 3L8 ⅄, 4WH5	Buda K428	6-4 5/16x4 3/4	Bot	TC	.....	.006	.006	.025	.020	10°B	.....
STEWART											
40A, 40AH	Con F4162	4-3 7/16x4 5/8	Top	.....	.010	.010	.014	.030	.025	TC	.....
60A	Con 6170	6-3x4	Top	.....	.010	.010	.014	.025	.025	.....	.....
61A	Con F6218	6-3 1/4x4 5/8	Top	.....	.012	.012	.014	.025	.025	.....	.....
45A, 45AS	Wau ZKA	6-3 3/4x4 1/8	Top	8°A	.010	.010	.012	.025	.025	.....	.....
47A, 50A, 50AS, 50AD	Wau BM	6-3 5/16x4 1/4	Top	TC	.010	.010	.012	.032	.025	.....	.....
49A, 49AD	Wau BK	6-3 3/4x4 1/4	Top	TC	.010	.010	.014	.032	.025	.....	.....
51A, 51AD	Con E602	6-4 1/4x4 1/2	Top	TC	.017	.017	.017	.025	.025	TC	.....
58A, 58AD	Wau MZ	6-4 1/4x4 3/4	Top	8°A	.010	.010	.010	.025	.025	.....	.....
38-6, 31X	Wau SRK	6-4 5/16x5 1/8	Top	10°A	.010	.010	.014	.025	.025	.....	.....
COE-1	Wau	6-3 1/2x4 1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....
COE-2, COE-3	Wau	6-3 5/8x4 1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....
COE-4	Wau	6-3 3/4x4 1/4	.....	.....	.....	.....	.....	.....	.....	.....	.....
STUDEBAKER											
K5	Own T	6-3 1/16x4 1/8	Top	15°B	.020	.016C	.016C	.025	.020	2°B	95
K10	Own OT	6-3 7/16x4 5/8	Top	2½°B	.020	.016C	.016C	.025	.020	2°B	95
K15, K15M, K15B	Own IT	6-3 7/16x4 5/8	Top	15°B	.020	.016C	.016C	.025	.020	2°B	95
K20, K20M, K20MB	Her JXB	6-3 5/16x4 1/4	Top	2°A	.010	.008H	.010H	.025	.020	TC	95
K25, K25M, K25MB	Her JXD	6-4x4 1/4	Top	5°A	.010	.008H	.010H	.025	.020	TC	95
K30, K30M	Her WXC3	6-4 1/4x4 1/2	Top	2°A	.010	.006H	.010H	.025	.020	TC	90
WILLYS											
38	Own 38	4-3 1/16x4 5/8	Top	TC	.010	.004	.006	.025	.020	5°A	87

ABBREVIATIONS: *—At 1000 RPM; Bot—Bottom; C—Cold; Con—Continental; H—Hot; Her—Hercules; Wau—Waukesha



The Alamo Heights Garage of San Antonio, Texas, is a good MOTOR AGE booster—which makes us proud. The garage has recently been rebuilt, changing its appearance as shown here—which makes the owner proud. We have no figures on the volume of service business, but we'll bet it's been on the up-grade since the place was dressed up.


HOW CAN YOU SELL THE WIRY JOE LINE AT 20% UNDER THE PRICE OF OTHER QUALITY LINES ?
DOSTAM
BUT HOW CAN YOU GIVE HIGH QUALITY AT SUCH LOW PRICES ?
DOSTAM
HOW CAN YOU PERMANENTLY MAINTAIN SUCH QUALITY AND PRICE LEVELS ?
DOSTAM
WELL I'LL BITE -- WHAT IS DOSTAM ?
THAT'S EASY -- I'LL TELL YOU

The DOSTAM METHOD eliminates top-heavy overhead expenses . . .

and organizes the complete production cycle from raw materials to finished product. In addition, through simplifying and reducing the costs of management, higher wages are paid to direct labor . . . the finest quality raw materials are employed . . . yet prices on the Wiry Joe Line consistently average 20 per cent under the prices for other well-known products.

As the only manufacturer in the field operating under this method, the Crescent Company, in a comparatively few years, has become the largest independent manufacturer of replacement automotive wiring.

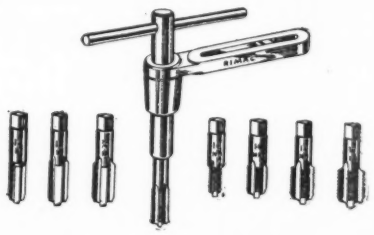
When you take on the Wiry Joe Line, you are assured of the highest quality . . . completeness of line . . . and prices that consistently average 20 per cent under the prices for products of similar quality.

This advertisement is appearing in all leading trade publications this month.

Wiry Joe AUTOMOTIVE WIRING
is produced under the
DOSTAM METHOD
THE CRESCENT COMPANY Auto Cable
Pawtucket, Rhode Island, U. S. A.
Montreal, Canada

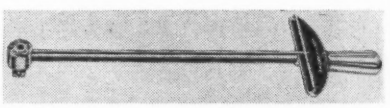
Cylinder Head Retapping Set

With the Rimac Cylinder Head Retapping set you are prepared for any and all forms of difficulties with spark plug openings — crossed or mashed threads, or completely stripped threads. Rethreading with the proper tap, or enlarging the opening to take the next larger size plug or a bushing to retain the same size plug are operations that are easily done with this set. Complete with holder and guide, 4 taps and 3 reamers. Net price $7.85. Rinck-McIlwaine, Inc., 16 Hudson St., New York City.



Duro Tension Wrench

Set the slide marker for foot pounds tension desired, pull on the handle until the pointer reaches that figure, and there you have the proper tension. Simplicity and convenience of design, with small compact head, give this tool easy access to restricted places. For use on cylinder heads, spark plugs, clutch assemblies, brake drums and connecting rods. Not effected by grease or oil. Made by Durol Metal Products Co., 2649 N. Kildare Ave., Chicago, Ill.



Fuels for the War Birds

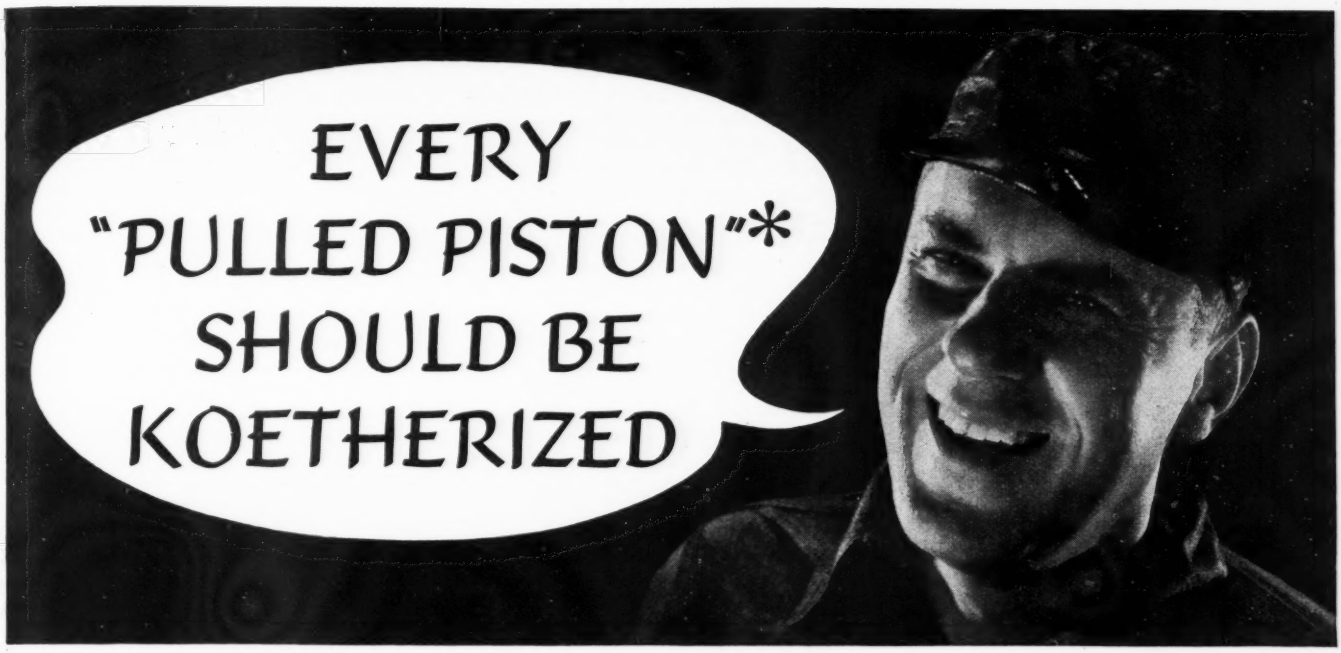
Higher speeds for the war birds with greatly increased maneuvering power is, in all probability, only a matter of months. Progress in research and experimental work on aviation fuels will provide 115 octane gasoline for national defense when needed, technicians report.

Present army and navy planes are being converted to 100 octane as rapidly as possible. Continued progress in refining has doubled the yield from available raw materials, in addition to promising the redoubling of present supplies in the near future.

The assurance of more than adequate supplies of high-powered fuels for military and commercial needs will influence to a great extent and possibly determine future progress in engine design, researchers believe.

Credit for the commercial development of synthetic gasolines belongs to fuel researchers who have discovered more about the chemistry of petroleum hydrocarbons and the methods and mechanisms of their rearrangements than has ever existed —even in the schools of organic chemistry.

EVERY "PULLED PISTON"* SHOULD BE KOETHERIZED



*Every time you pull a piston out of the block, it should be Koetherized before re-installation. Koetherizing *permanently* corrects skirt collapse and restores original factory clearances without the use of "spring" expanders or tricky gadgets. Regardless of what piston rings are used, regardless of the condition of cylinder or piston, *every pulled piston should be Koetherized before re-installation.* It costs no more to Koetherize than to use expanders and it makes pistons better than new, because Koetherized piston skirts can never collapse again.

Koetherizing takes the gamble out of ring jobs . . . it makes any ring job a better job. Write for the name of the nearest Koetherizing jobber.

KOPPERS COMPANY, American Hammered Piston Ring Division, Baltimore, Md.

KOETHERIZING

A national service available through jobbers of

AMERICAN HAMMERED PISTON RINGS

Legally Speaking

(*Continued from page* 20)

This employe had been engaged by the house to drive the car for a long trip. Without the knowledge of the employer, the driver of the car took three persons as passengers for part of the trip. Each of these persons paid the driver a specified amount for the journey.

The automobile liability policy contained this clause: "No insurance is granted by this policy while any private passenger or commercial motor vehicle herein is being used for rental or livery purposes or the carrying of persons for a consideration."

Under this set of facts the Federal court decreed that the insurance company was not liable under the policy for the injuries sustained by the passengers, who were thus carried in the car "for a consideration." In law a consideration may be money or any other thing of value. A frequent instance in such cases is an arrangement whereby a passenger carried in an insured car pays for the gasoline for the trip. This would be a sufficient "consideration" to violate the terms of such a policy.

In the Federal court case above cited, neither the injured parties nor the business house which had the insurance policy could recover from the insurance company, but the injured parties had a legal right to recover from the business house since its employe was driving the car in the interest of the employer's business at the time of the accident. The fact that the employer had no knowledge of the carrying of the paid passengers made no difference in his liability.

Customer's Goods

Independent repairmen often receive goods belonging to customers for storage, repair, fitting or matching of replacement parts and other purposes. Such a transaction is called a bailment. The customer is the bailor and the repairman is the bailee.

What happens if the customer's goods are lost, damaged, or destroyed while in the business man's hands?

"It is the positive duty of a bailee to return the bailor's goods or explain their loss," declares the Supreme Court of Washington, "and in the absence of an explanation or excuse by the bailee of his failure to return such goods, a negligent loss by the bailee will be presumed." Meaning, in short, that the repairman will have to pay for the loss of the goods.

But suppose the loss occurs through no fault of the repairman?

"When the bailee has shown," continues the same Court, "that such loss resulted from burglary, larceny, fire or some other cause which of itself does not point to negligence on the part of the bailee, the burden of proof then rests on the bailor." In such a case, the customer would have to prove that the loss of the goods by theft, fire or other disaster was actually the result of the repairman's carelessness.

Those Exemption Claims

Garage owners granting credit should bear in mind that in every state a debtor is allowed an "exemption" by law. Under these exemption laws the debtor is enabled to claim as his own the goods, money or other assets allowed to him by the exemption law of the particular state. This means that, no matter how much he may owe an attaching creditor, the creditor can not touch the exempted goods in order to get his money. The goods exempted by law are absolutely protected from the debtor's claims.

Repairmen granting credit, therefore, should remember that if the time comes to take legal action to get their money, they can recover only out of such goods and assets belonging to the debtor as are not protected by the exemption statute of his state. Which perhaps is another way of saying that a good moral risk is the only good credit risk. It is not difficult for the ordinary debtor to defeat collection by claiming his exemption rights.

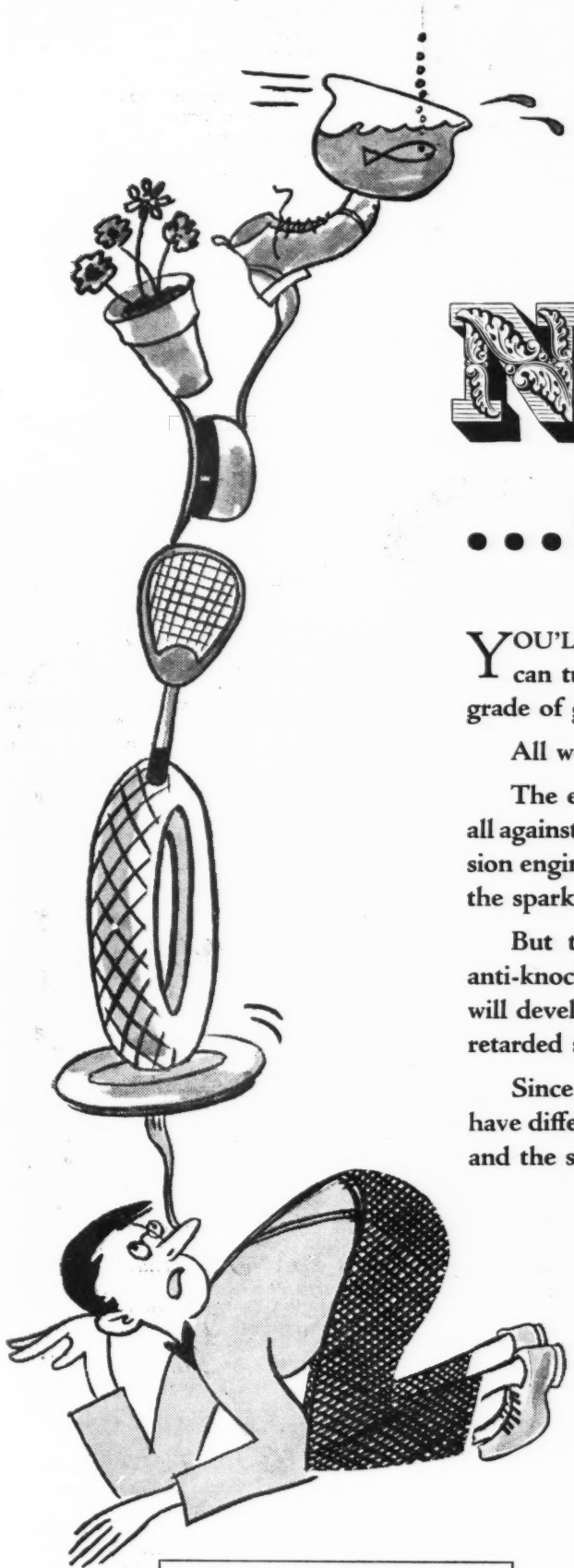
AJAX

A NEW AJAX JACK IN EVERY USED CAR

● Ajax offers a complete selection of Bumper Jacks and Screw Jacks for used car equipment—and all at remarkably low cost. Car dealers everywhere have found them real values and builders of customer good will. See them, and other models of Ajax Jacks for vehicle equipment and shop service—now displayed on your jobber's floor.

AJAX AUTO PARTS COMPANY, RACINE, WISCONSIN

A JACK FOR EVERY AUTOMOTIVE NEED



Nice Trick

...if you can do it!

YOU'LL still occasionally find a man who honestly believes he can tune-up a car for top performance irrespective of the grade of gas in the tank.

All we can say to him is, "Nice trick—if you can do it!"

The engineering facts—yes, the hard-boiled, basic facts—are all against him. To start with, all modern cars have high compression engines . . . built to give top power and economy only when the spark is *advanced* to the point of "maximum performance."

But the instant he advances the spark further than the anti-knock quality of the gasoline permits, a "knock" or "ping" will develop. And that wastes fuel and power just as surely as a retarded spark.

Since there are different grades of gasoline sold today, cars have different grades of performance, depending on the gas used and the spark setting.

YOU HAVE THESE THREE CHOICES

BEST PERFORMANCE—with gasoline marked "Ethyl" on the pump or globe. It is highest in anti-knock and all-round quality. Contains enough tetraethyl lead so that the engine's spark can be *advanced* closest to the point of maximum power and economy without "knock" or "ping."

GOOD PERFORMANCE—with "regular" gasoline which permits the spark to be considerably advanced without "knock" or "ping." Most "regular" gasolines now contain tetraethyl lead, as shown by the "Lead" signs on the pumps.

POOR PERFORMANCE—with low-grade gasoline, poor in anti-knock quality. With low-grade gasoline in a modern car, the engine's spark must be *retarded*—which means *loss* of power and economy.

TUNE IN ON "TUNE-UP TIME" *Radio's new hit show, on a coast-to-coast hook-up . . . designed to bring you tune-up business . . . Thursdays . . . Columbia Broadcasting System, 10 p.m., E. S. T.*

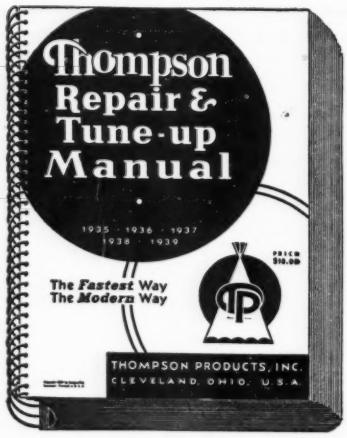
ETHYL GASOLINE CORPORATION, *sole manufacturer of anti-knock fluids containing tetraethyl lead*

Catalogs, etc.

(Continued from page 38)

Valvoline Oil Co., Cincinnati, O. It contains a complete description of Valvoline lubricants, and a guide for their use in passenger cars from 1934 to 1939 models, in popular make trucks and tractors.

Featuring clear illustrations and complete descriptions of the entire line of service station lubrication equipment, the new Graco Service Equipment Catalog by the Gray Co., Inc., Minneapolis, Minn., is a valuable aid to the dealer seeking modern equipment.



A 500-page manual of repair and tune-up operations covering cars from 1935 to 1939 has been prepared for the automotive maintenance trades by Thompson Products, Inc., Cleveland, Ohio. The manual, with a number of advertising helps, is offered by Thompson Products' distributors in return for an order for Thompson replacement parts.

The complete line of hydraulic brake parts, brake hose and stop-light switches made by Chefford-Master Mfg. Co., Fairfield, Ill., is described in a new Bulletin just out. It features parts in bulk as well as in various assortments, and individual kits for both master and wheel cylinders. Copies of the new Brake Parts Bulletin may be obtained by writing the manufacturer.

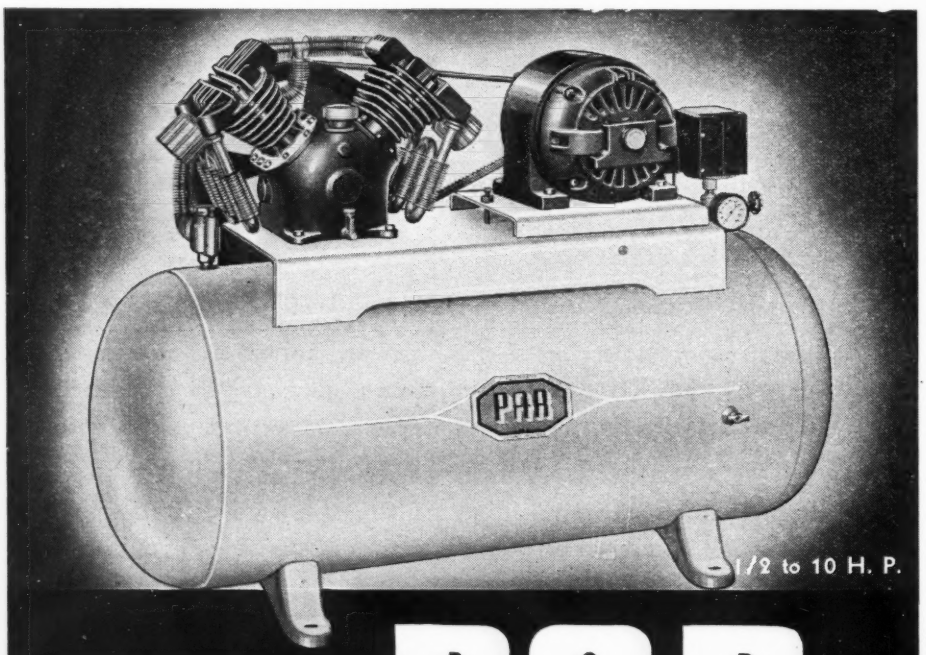
An illustrated catalog containing full information on their complete line of hose for all requirements has been announced by The DeVilbiss Co., Toledo, Ohio. The complete line of hose connections, valves, couplings and adapters manufactured by the company is also included. Full specifications are listed for each type of hose, as well as much valuable information to aid in the selection of the right hose for the right job. Copies may be secured by writing the company.

The recently isued Permite Catalog of engine replacement parts for tractors and combines is said to be the most complete ever published, according to officials of Aluminum Industries, Inc., Cincinnati, Ohio. Not only does this new catalog cover engine parts, but new application data is also included. Parts for old models, some of them dating as far back as 1915, are listed. Copy of the catalog may be obtained by writing Aluminum Industries, Inc.

The South Bend Lathe Works, South Bend, Ind., has published a new 32-page catalog, No. 46-B, announcing the new Model 9 in. Workshop Precision Lathe. Eight different types of the lathe are shown in the catalog, with more than 150 illustrations. A copy will be mailed upon request.

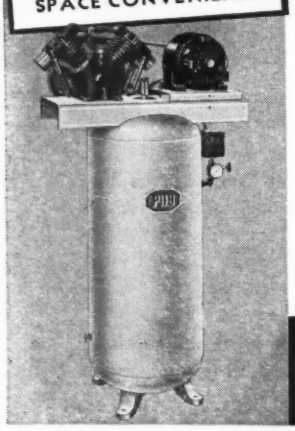
A new catalog of the Handee Tool of a 1001 uses has been issued by the Chicago Wheel & Mfg. Co., 1101 West Monroe St., Chicago, Ill. This new catalog contains, through illustration and description, many of the uses to which this tool can be put in the home or at work, and the operations it performs easily which would be difficult if not impossible with other equipment. Copies will be supplied upon request.

(Continued on page 70)



COMPLETE YOUR STATION WITH PAR

VERTICAL MODELS FOR SPACE CONVENIENCE



AIR COMPRESSORS

Be assured of adequate, unfailing air supply when you select the PAR model best suited for your needs . . . Seventeen sizes, every one of simplified modern design; sturdy, and efficient for long and dependable service . . . Put it up to PAR!

Write or Wire for Details

MODERN EQUIPMENT CORPORATION
DEFIANCE, OHIO

Only SKF gives SKF quality

The word "quality" by itself doesn't mean anything. There's *poor* quality and *good* quality. But when it comes to *bearing* quality, there *is* a standard of comparison.

Make a mental note of these things: There is only *one standard* for SKF Bearings—in raw materials, manufacturing processes, tolerances, and finished product—adopted after *years* of experience and research.

SKF not only has the knowledge and experience, but constantly utilizes this knowledge to develop new ideas and manufacturing methods which enable us to keep faith with millions of SKF users and supply *bearings which give long life.*

Don't say, "bearing quality"; say, "SKF quality" . . . the STANDARD OF COMPARISON.

SKF INDUSTRIES, INC.
FRONT ST. & ERIE AVE., PHILA., PA.
4260

BALL BEARINGS **SKF** ROLLER BEARINGS

Plan Championship Race for Midgets

A National Championship race for midget cars will be run next December in Los Angeles, Calif., it was announced by the American Automobile Association's Contest Board when the group assumed charge of the tiny cars on the Pacific coast last month. The AAA replaced the American Midget Association in supervising the miniature competition in California.

Art Pillsbury, member of the Contest Board and regional director of AAA competition, guaranteed a minimum purse of $5,000 for the title classic to be run at the famous Gilmore Stadium.

The national title event will follow the crowning of the Pacific Coast champion in the Thanksgiving Day Grand Prix race. While a date has not been assigned for the championship race, it will be run early in December.

In the first race under the new set-up run on Feb. 19 amid intermittent showers, the prize purse amounted to come $1,000 on a 37.5 percentage of the gate receipts.

The National Championship classic will be reserved for the top ranking drivers and cars of the United States, Pillsbury said.

In the schedule which is being run regularly until the Thanksgiving finale, the midgets will compete in "A" and "B" class events, based on the caliber of drivers and cars. Points will be awarded in each division toward the Pacific Coast Championship which will be determined in the Grand Prix on Thanksgiving Day. Drivers will also share in a prize money bonus award to be distributed at the close of the season.

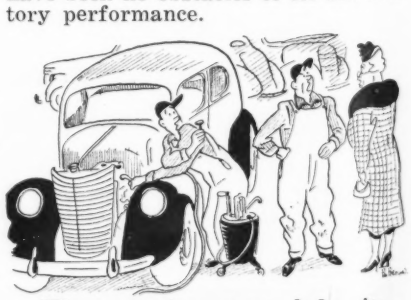
Frees Sticky Valves

For freeing sticky valves, keeping carburetor jets free from gum formations, freeing rings and preventing carbon formation the Lubaid Co., Milwaukee, Wis., recommends its new product LUBAID T. It is a penetrant added to the gasoline—4 oz. to each

10 gal.—either directly to the gas or fed through upper cylinder lubricator. If used only occasionally, add 4 oz. to each 5 gal. For new or rebuilt motors the manufacturer recommends 12 oz. of LUBAID T to each 10 gal. of gas for the first 500 miles, and 4 oz. to each 5 gal. until the car has run 1000 miles. It is available in 4 oz. sizes, 12 oz., gal. and drums.

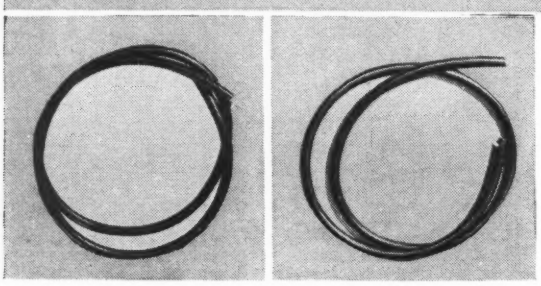
New Canadian Company To Build Snowmobiles

Snowmobiles will be manufactured by the recently organized S & S Aircraft Co., Canada. The vehicles will be powered with gasoline engines and propeller driven. Skis are of the laminated aircraft type made with three layers of oak. In tests made at the Winnipeg airport the snowmobile reportedly attained a speed of 40 m.p.h., and high snow drifts and bare patches of sticky earth were said to have been no obstacles to its satisfactory performance.

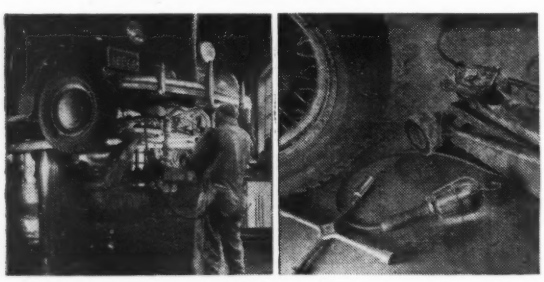


"You got it wrong, lady, its change your oil every thousand miles and see your dentist twice a year."

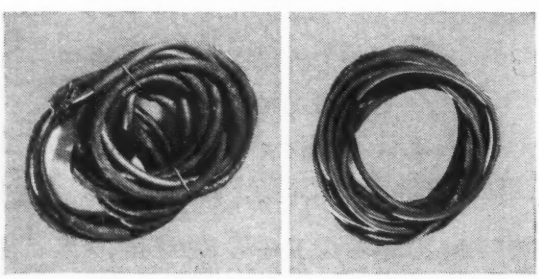
WHAT A BEATING THIS NEOPRENE PORTABLE CORD CAN TAKE!



● Here are two sections of lamp cord recently tested under actual service conditions in a repair shop. One is rubber-covered and the other is neoprene. You see they looked just alike . . . *at the start.*



● But in the shop they met up with oil and grease, and with scuffing and crushing . . . the usual wear and tear.



● After only six months, the rubber-covered cord (left) was swollen, cracked, ready to be replaced. While even after a whole year, the cord covered with neoprene (right) was still in its prime, with many months of economical service ahead.

ASK YOUR regular supplier for long-lived neoprene cord or write us for a list of manufacturers.

Read how this new-type portable cord can save you time and money!

As everybody knows, almost any lamp cord would last indefinitely if you coddled and pampered it. Especially cord covered with high grade rubber.

But of course you can't coddle or pamper cord around a repair shop or a service station. Here it gets kicked around and yanked around . . . yes, and dragged through grease and oil, which will rot even the best of rubber.

That's why leading suppliers of portable cord for shops and service stations are covering it with jackets made of Du Pont *neoprene* instead of rubber nowadays. For neoprene . . . while it looks and feels like rubber . . . isn't rotted by oils, grease, gasoline, or acids. (At the left you'll see how, in a recent shop test, neoprene-covered cord lasted more than *twice* as long as rubber-covered.)

Take a hint. Next time you need new cord, be sure to ask your supplier for one with a neoprene jacket. You'll be saving money with every foot you buy.

DU PONT

NEOPRENE

E.I. du Pont de Nemours & Co., Inc.
Rubber Chemicals Division
Wilmington, Delaware

118% Sales Increase...

ONLY QUALITY COULD BUILD SUCH BIG GAINS

Toledo builds only the highest quality replacement parts. And only super-quality could build the big 118% sales increase made by Toledo in the past three years. That's why quality and quality alone is Toledo's number one manufacturing objective.

Give your customers better jobs at no increase in cost. Standardize on the Toledo line—first choice of the repair trade. Always specify Toledo by name on every order . . . Insist on Toledo.

THE TOLEDO LINE IS COMPLETE

Valves and Valve Parts
Pistons: Aluminum, Cast Iron
Chrome-Plated Piston Pins
Cylinder Sleeves
Cylinder Sleeve Assemblies
Engine Bearings
Water Pumps
Water Pump Parts
Tie Rod Ends
Chassis Bolts and Bushings
Shackles: Tryon, Silent "U"
Knee Action Parts

THE TOLEDO STEEL PRODUCTS COMPANY
TOLEDO, OHIO, U. S. A.

Warehouses: Atlanta . Boston . Chicago
Cincinnati . Cleveland . Dallas . Detroit
Kansas City . Minneapolis . New York
Philadelphia . St. Louis . Wichita . Los Angeles
San Francisco . Portland . Seattle

Look for the Name TOLEDO

Catalogs, etc.

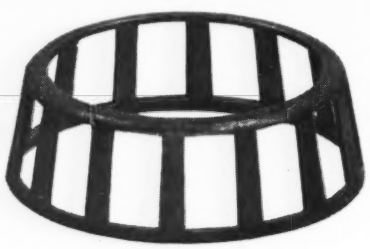
(Continued from page 66)

The Brookins Mfg. Co., Cincinnati, Ohio, has issued its 1939 catalog of service station equipment. Included with the catalog are new Jobber and Dealer cost sheets, with special markings showing which items are new, and which have revised prices.

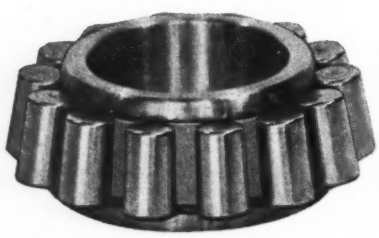
The new line of Motorola Car and Home Radios, recently announced by Galvin Mfg. Corporation, Chicago, Ill., is thoroughly covered in a new 1939 catalog recently issued. Outstanding features of the sets are fully explained. There are complete illustrations of the matched instrument panel controls manufactured by the company, as well as descriptions of the merchandising helps, signs and other sales ideas offered.

The Crescent Co. of Pawtucket, R. I., producers of Wiry Joe Automotive Cable, have included in their 1939 promotion program a complete line of new descriptive literature. This includes the 1939 24-page catalog. Applications for each type of wire and cable are described indicating the way in which the requirements of various types of service have been met in the production of this line.

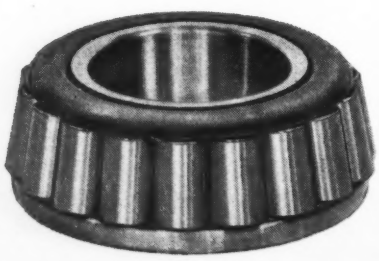
Naturally, MORE ROLLS GIVE MORE CAPACITY



This is the cage of a conventional tapered roller bearing.



This is how a conventional bearing looks with the cage removed. Note the spaces between rolls. These spaces, naturally, carry no load.



This is a Tyson Cageless Bearing. Tyson eliminates the cage, and fills the in-between spaces with more load-carrying rolls — giving 30% more capacity, twice the bearing life, and maximum rigidity. It will pay you to Tie Up with Tyson.

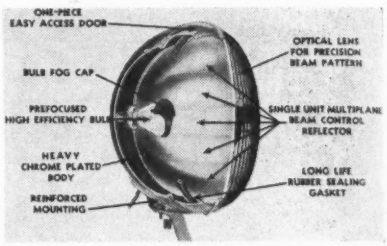
Cageless FOR HARD SERVICE Cage-type FOR REGULAR SERVICE

Tyson

TYSON ROLLER BEARING CORPORATION, MASSILLON, OHIO

Guide Driving and Fog Light

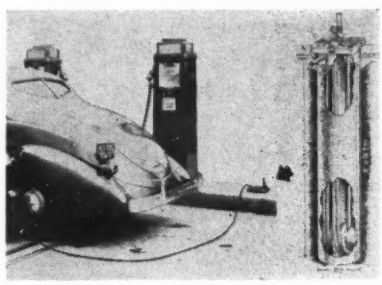
Exceptional road lighting efficiency is claimed for the new Guide Super-Ray Driving and Fog Lamp announced by the Guide Lamp Division of General Motors, and sold through United Motors Service distributors. The new light employs a patented


ONE-PIECE EASY ACCESS DOOR
BULB FOG CAP
PREFOCUSED HIGH EFFICIENCY BULB
HEAVY CHROME PLATED BODY
REINFORCED MOUNTING
OPTICAL LENS FOR PRECISION BEAM PATTERN
SINGLE UNIT MULTIPLANE BEAM CONTROL REFLECTOR
LONG LIFE RUBBER SEALING GASKET

multi-parabolic reflector which carpets the road far ahead with an intense flat spread beam of light, yet controls the light so effectively that no stray light beams rise sufficiently high to cause annoying glare to approaching drivers. Supplied complete with universal mounting bracket with theft-proof attachment, and carries a list price of $10.45.

Air and Water Underground

Gone is the water can and air hose reel. In its place is a plate in the pump island from which project the nozzles of an air hose and a water hose. Piping and reels are underground, housed in an 8-in. cylinder. Permits one-stop service without unsightly cans of water (which are always empty)—no more need for driv-



ing to the corner for air service. Hose for either water or air pulls out 21 ft., and retracts through easy-running brass rollers. No springs, gears, ratchets, packing glands or automatic valves. Write the manufacturer for complete information. Revere Electric Co., 757 W. Jackson Blvd., Chicago.

Polish and Protect

It isn't enough to polish the car. You have to protect the lustre, also. So says C. H. McAleer, president of the McAleer Mfg. Co., 2431 Scotten Ave., Detroit, Mich. To promote this idea the company is featuring a special combination package which includes a 30c. can of McAleer Quick Wax with a regular 50c. pint of McAleer's Liquid Polish and Cleaner. This two-unit combination is packaged in a colorful counter display.

Grab one of these HEIN-WERNER HYDRAULIC JACKS--and get going!

HEIN-WERNER
HYDRAULIC
Road Service Jack
• has quick removable handle
• fits in service car or tow truck and is easy to take to outside job
• also ideal for shop use . . . . . .
Illustration above shows how slight finger pressure on two levers removes handle . . Illustration above shows how easy it is to put this jack in a service car.

You can take life a lot easier and make more money handling jobs on the road and in the shop—with the aid of a Hein-Werner Hydraulic Jack.

It's no wonder so many garagemen are boosting this new H-W Model "W" 1½ ton capacity Road Service Jack. It can easily be carried to the job in service car. It has quick removable handle . . . No bolts or pins to be taken out . . . Slight finger pressure on two levers removes handle (see illustration at left) . . . Just as easy to put back . . . Light weight makes this jack easy to lift . . . Hand latch locks handle in horizontal position making it easy to position jack by rolling it on front or rear wheels.

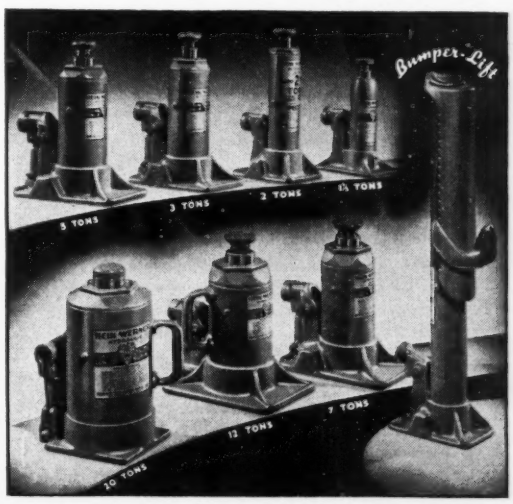
When used in the shop, handle can be removed after car is jacked up or when jack is stored under work bench . . . Length of jack 25″ . . . Length of handle, extended 47½″ . . . Low point 4″ . . . Saddle high point, 20″ . . . Saddle, 6½″ diameter . . . Capacity 3,000 pounds.

All Models In This Complete Line Are *Built Right* and *Priced Right*

And when it comes to hand jacks for passenger cars and trucks—you just can't beat Hein-Werner Hydraulic Jacks . . . Complete line includes the "Bumper-Lift" and the "Bullet" 1½ ton capacity jacks for passenger cars . . . Also 2 ton "Light Truck Special," 3, 5 and 7 ton capacity jacks for trucks, and 12 and 20 ton jacks for trucks and buses . . . And a complete line of FLOOR JACKS—1½, 2, 3 and 4 ton capacity.

Ask your jobber or write us for 1939 prices and details on complete line.

HEIN-WERNER MOTOR PARTS CORP., Waukesha, Wisconsin



FEW MODELS ENGINEERED TO DO THE WORK OF MANY
HEIN-WERNER hydraulic JACKS

What Next?

Japanese manufacturers of motor cars have evolved a novel method of production in an attempt to exploit the Latin American market with a cheap automobile, according to Hans Otto Strom, author-engineer, recently returned to California from Lima, Peru. Strom was deported by Peruvian officials because, he explained, the government took exception to a book he had written on Peru.

"The motor cars I observed in Lima that came from Japan were small, cheap and extremely light, hence required little power for propulsion," Strom said.

"The cars were lighter than any other automobile I have ever seen because the body was made of some type of paper. As it did not rain during the period I observed these cars, I am not in a position to know what happened when saturation ensued."

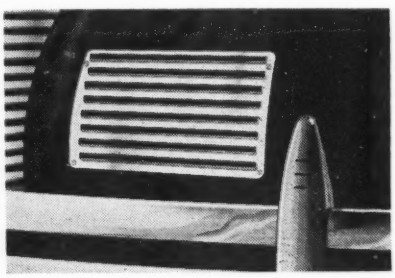
RCA Develops Electric Engine-Indicator Unit

For designers and manufacturers of high-speed internal combustion engines RCA research engineers have developed an electrically operated engine-indicator diagram equipment for accurate measurement of rapidly changing cylinder pressures. The RCA equipment is composed of a pressure unit, a cathode-ray oscillograph, an amplifier, and a synchronizer unit.

The pressure unit converts rapidly changing pressures into electrical impulses which are amplified and pictured on the screen of a cathode-ray tube. This is accomplished by transmitting these pressures to quartz crystals which, through their "piezo-electric" properties, generate on their surfaces electrical charges directly proportional to the pressures applied to them.

Catwalk Grilles

Dress up that 1939 Chevrolet with Edwards Fender Grilles, made by The Edwards Mfg. Co., 5th and Butler Sts., Cincinnati, Ohio. Made from heavy polished sheet steel, chrome plated, they fit over the louvres in the



fender catwalk and are held in place by self-tapping screws. Designed to match the center radiator grille, Edwards Fender Grilles add that finishing touch of modern front end appearance.

Manufacturers Vote Against Truck Shows

Following the announcement that the New York Automobile Show will open in Grand Central Palace, New York, on Oct. 15, truck manufacturers in the Automobile Manufacturers Association declared against national motor truck shows by the following resolution:

"As the records over a period of years prove conclusively that national motor truck shows, however well managed, are not sufficiently productive of either consumer or dealer interest or sales possibilities, the truck manufacturers in the Automobile Manufacturers Association hereby vote their opposition to shows of that character. However, the manufacturers will continue their customary procedure of making displays selectively at vocational and automobile shows."

U. S. Electrical Tool Promotes Two

Mr. Jack Smith, formerly in charge of the St. Louis district for The United States Electrical Tool Co. of Cincinnati is now in charge of sales for the Southeastern territory with headquarters in Atlanta, Ga. Robt. C. Upham who occupied the position of field service representative throughout the United States assumes charge of the St. Louis branch office.

It's HANDY

---this work-bench that goes to the job!

Fig. 992

Drawer is extra

You can eliminate a whale of a lot of time ordinarily wasted running back and forth from the repair job to a work-bench at some remote part of the shop. Now, with the

"HALLOWELL"
Semi-Portable
STEEL WORK-BENCH

you can have a work-bench right alongside every job. Just grab the handles and push it around like a wheelbarrow. It gives you a place for tools, vises, grinding wheels, etc., plus a smooth working surface. It's all steel so it can't get oil soaked.

It's inexpensive. Write for details.

"HALLOWELL"
STEEL TOOL STANDS

A stand where tools can be safely kept under lock and key, yet always visible. Extremely convenient and a real favorite in hundreds of shops.

"HALLOWELL"
STEEL WORK-BENCH

Strong and rigid, its welded construction keeps it that way. Smooth steel top can't splinter or get oil-soaked. Over 1300 different combinations to choose from . . . there must be one to suit your requirements. Surprisingly low in cost.

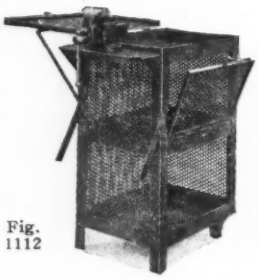


Fig. 1112

Get all the facts, now, about these three labor saving products.

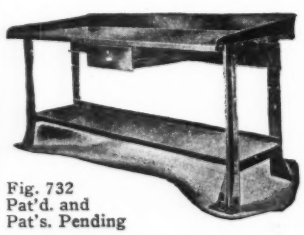


Fig. 732
Pat'd. and
Pat's. Pending

STANDARD PRESSED STEEL CO.

BRANCHES
BOSTON
DETROIT
INDIANAPOLIS

JENKINTOWN, PENNA.
Box 561

BRANCHES
CHICAGO
ST. LOUIS
SAN FRANCISCO

Remote Control

(*Continued from page* 17)

jacket, as illustrated. This measurement should be 17/64 in. on the Master DeLuxe, and 23/32 in. on the Master "85" models. Move the mast jacket up or down to secure this measurement. Turn the mast jacket until the gear shift control shaft is in the center of the hole in the instrument panel bracket. Install the nuts on the steering column to instrument panel bracket and tighten securely. Then tighten the mast jacket clamp at the steering gear housing. Install the mast jacket bearing retaining spring (on Master DeLuxe models) and reinstall the steering wheel. Check to be sure that the control and selector shafts move freely.

8. Pull the selector control rod forward until the transmission interlock bottoms firmly against its stop. In this position, adjust the swivel by screwing it up or down on the rod until the pin on the swivel is ⅛ in. to the rear of the hole in the lever. Tighten the lock nut up against the swivel. Pull the lever towards the rear and connect the rod, install the anti-rattle spring, flat washer and cotter pin onto the swivel pivot pin. Pulling the selector control lever backward insures spring tension on all selector parts, retaining the selector mechanism definitely in high and second gear positions and preventing rattles.

9. To adjust the shift control rod, set the gearshift lever in neutral. Locate the clevis pin in the end of the shift control rod so that it is in the center of the elongated hole in the transmission operating lever, as illustrated. Then adjust the swivel by screwing it up or down on the shift control rod until its pivot lines up with the hole in the shift control lever, as illustrated. Install the anti-rattle spring and lock on the swivel pivot pin.

10. To check the transmission operating lever and linkage, remove the floor mat and plate above the transmission. Pull the clevis pin from the shift control rod and then remove the boot covering the operating lever. Remove the clevis pin from the vacuum cylinder piston rod yoke and reactionary lever systew. Remove the two shift control rod links. These links carry the bushing sleeves on which the valve links are mounted, and therefore their removal permits the valve links to drop down. Push the piston rod back in the cylinder and then install the clevis pin through the piston rod yoke and the valve links. This is important, as otherwise the valve links may be turned on the valve rod and upset the valve adjustment. Then remove the transmission cover and remove the idler and reactionary levers from the operating lever. Check all parts for wear, and for free operation.

11. When reinstalling, coat the reactionary and idler levers very lightly with a graphite grease. Install the reactionary lever pivot pin in the transmission operating lever. Then install the reactionary levers over the pivots. Assemble the idler levers; install the clevis pins and cotter pins. Install the transmission cover on the transmission, being careful to line up the shifter interlock so that its ends fit into the slots in the shifter yokes. Install and tighten cap screws.

12. Remove the clevis pin from the piston rod yoke and then pull the rubber boot forward on the yoke until the valve links extend beyond the piston rod yoke, as illustrated.

13. Connect the valve links to the reactionary lever system by inserting the bushing sleeves on the shift control rod links through the eyes in the idler levers and valve links. Push the piston rod yoke forward over the reactionary levers; line up the link holes with a punch, as illustrated, and install the clevis pin and cotter pin it securely. Coat the inside of the leather boot lightly with a graphite grease and install it over the reactionary levers. Thread the clevis of the shift control rod over the boot and then, using a punch, line up the clevis pin holes in the clevis, the washers in the boot, and the shift control links. Install the clevis pin and cotter pin. Tie the wires around the front end of the rubber boot and around the transmission operating lever. Connect the selector control rod to the selector lever on the transmission cover.

HELP
...for your repair problems may be had for the asking. Just drop a line to——
MOTOR AGE
Readers' Clearing House

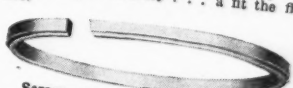
With
SENSATIONAL SPRING-ALLOY SPACER
New-Principle Wiping Action
Stops Oil Without Harsh Pressure
Seals All Jobs Safely

Tackle ring jobs with confidence with Wausau "OIL-SAVR"—the ring that's got *backbone* enough to make "bad ones" behave—that's really *gentle* enough for easy jobs. New free-flushing spring-alloy spacer cushions segment action—wipes the wall with rotary sweep. New-design segments and inner-ring lengthen ring and wall life. With Wausau "OIL-SAVR" you can *stop* oil pumping in bores you'd ordinarily consider too bad to be fixed with rings—and do a job that's *safe* and *"stays put."*
Ask your jobber—or send for FREE sample ring and literature.

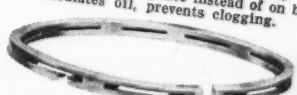
WAUSAU MOTOR PARTS CO.
1100 Harrison Blvd. Wausau, Wis.

Do the complete job, with WAUSAU . . .
A Combination for Every Condition
20.9% more flexibility, 5.9% more strength in Wausau cast iron rings, individually cast in one piece of finest grain iron. Uniformly round, precision machined.

Compression Rings (X or Plain)
No adjusting necessary . . . a fit the first time.



Scraper Type Rings (X or Plain)
Wiping edge on ring face instead of on bottom circulates oil, prevents clogging.



Super Port-Oil Rings (X or Plain)
Ideal for rebores or light tapers. Special design forms protective oil collar, seals gap against vacuum-drain.

WAUSAU HAS SPECIALIZED FOR 17 YEARS
IN PERFORMANCE PISTON RINGS FOR STANDARD EQUIPMENT AND REPLACEMENT

American Hammered Anticipates Good Year

American Hammered Piston Ring division of Koppers Co., Baltimore, announces that 1938 was the biggest sales year it has ever had in the automotive replacement division of its business. Indications, based upon a survey of its automotive jobbers in all parts of the country, are for a steadily upward sales trend in 1939, the company states.

"We have enjoyed a steady increase in sales volume every year since 1932," said T. Latimer Ford, sales manager. "Approximately 90 per cent of our jobbers showed increases in parts sales in 1938 over 1937 and all are optimistic for 1939.

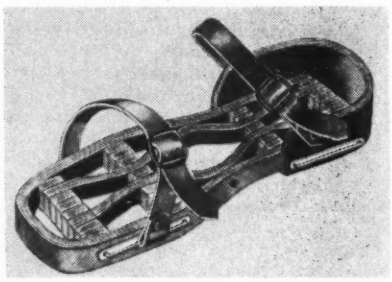
Drivers-Accessory Men Meet

The automobile racing fraternity and accessory firm representatives will hold their fourth annual convention April 21 and 22 in Dayton, Ohio, according to Dr. J. K. Bailey, of Dayton, chairman of arrangements. The convention was held last year at Dayton.

A banquet and a round of social events for drivers, their wives and girl friends will be held during the two-day event.

Tirex Undershoes

Protect your health and your shoes by wearing Tirex Undershoes on that hot, hard, wet or greasy floor. Made by Tirex Mat Co., 3045 Broad Creek Road, Norfolk, Va., of heavy rubber and fabric combined, put together



with rust-proof steel wire and zinc. Look like Roman sandals, and fit over regular street shoes. Non-skid in character, flexible and resilient to provide safety and comfort, and eliminate fatigue.

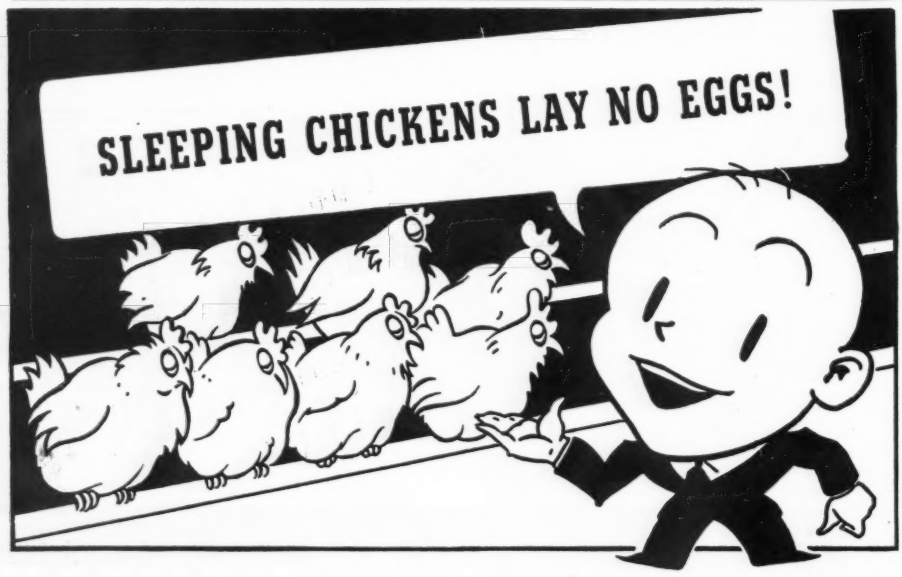
American C & C Appointments

American Chain & Cable Co., Inc., announces that R. E. Greenwood has been appointed district sales manager of the Chicago territory of the American Chain division, succeeding G. B. Kutz who has been transferred to York, Pa., as assistant to the general manager of sales.

R. C. Brenizer has been appointed Philadelphia district sales manager of the American Chain division, succeeding R. E. Greenwood, transferred to Chicago.

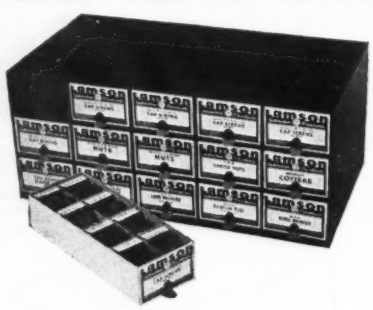
Sears to Introduce New "Squeegee" Tire

Sears Roebuck & Co., leading mail-order house marketing private brand tires, soon will introduce a new type of squeegee tread pneumatic tire in direct competition with similar type treaded tires being featured by the major independent tire manufacturers. Rush orders for molds for the new tire are understood to have been placed with many mold manufacturers, including at least four in the Akron area. The new tire, it is reliably reported, will have a tread design not dissimilar to non-skid tread designs of the major tire manufacturers.



You can't buy "Shelf-Warmers" from LAMSON

• More than six thousand repair shops, car dealers and fleet maintenance shops have reduced their inventory of sizes, stopped their losses from obsolete stocks, saved time lost hunting for the right sizes of bolts, nuts, cotters and cap screws (as well as all other kinds of fastenings) with the installation of a LAMSON "Treasure Chest." The LAMSON "Treasure Chest" is an all-steel cabinet, with 15 drawers packed with the correct range of sizes of all fastenings needed to take care of practically all motor car repairs, and each size is packed in its own standard package at 25c. Sold separately, each piece brings its own price as a part used in a repair job. The profit margin is high, there are no losses, and no lost sales. A glance tells you the amount of stock you have on hand in any size. Ask for further particulars from your jobber, or use the coupon below.



THE LAMSON & SESSIONS COMPANY
General Offices: CLEVELAND, OHIO

PARTICULARS, PLEASE... CLIP THIS COUPON TO LETTERHEAD AND MAIL

Send us Catalog and Price List for Lamson "Treasure Chest" standard service stock.

Our jobber is _____

Our firm name _____ Address _____

City _____ State _____

LAMSON & SESSIONS
BOLTS • NUTS • COTTERS • CAP SCREWS • SPECIALS

This advertisement appears in MOTOR AGE—March, 1939 and in MOTOR WORLD WHOLESALE—March, 1939

"—and how much trade-in allowance on this old one?"

RELIABLE . . . MAKES A SPECIFIC JACK FOR YOUR NEED

Every Model has been PROVED by Use in Thousands of Stations and Garages all over the World

Hand Hydraulic. 1½ to 12 ton capacity.

(Only 3 of 34 models are shown here)

1-H R Hydraulic. Has detachable handle for use in Service Car. 1¼ ton capacity.

4H. Heavy Duty Hydraulic. Two speed Pump. 4 ton capacity.

No matter WHAT your requirements for a jack may be—mechanical or hydraulic, for tool box or Service Station, for truck or passenger car—Reliable has a model to fit your need exactly. And Reliable Jacks are everything the name implies — you can count on them to be dependable. They are built by a company with 39 years' experience in the jack business (formerly the Elite Manufacturing Company.)

Check up on your jacks now. Do they have the exceptional lift—the safety features—the design, the strength and dependability of Reliable Jacks?

ASK YOUR JOBBER:

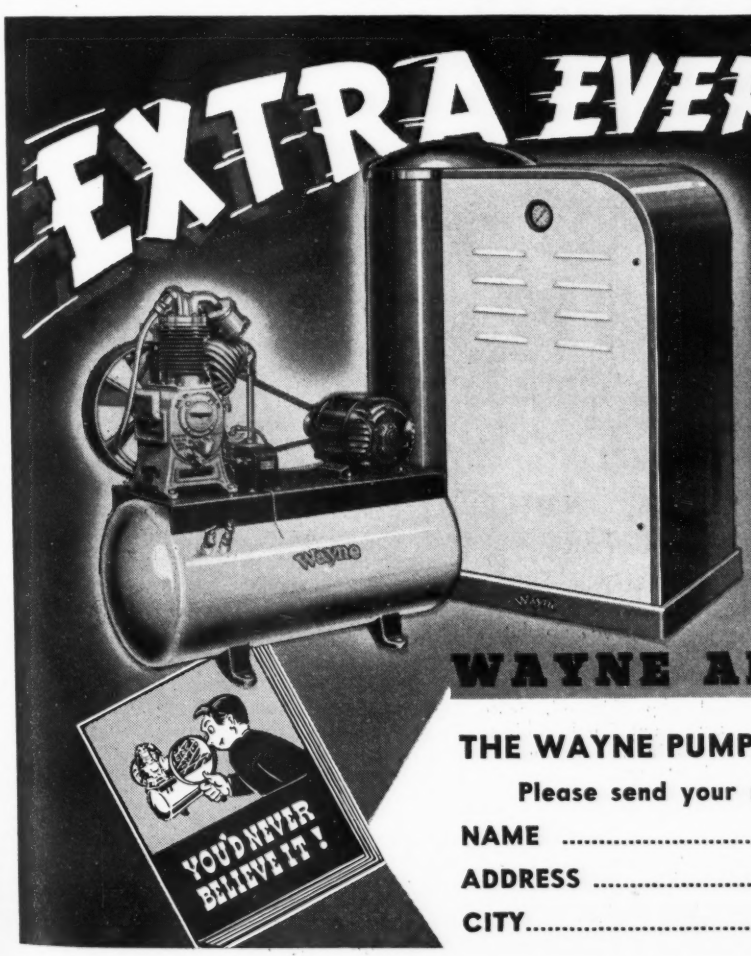
Your Jobber is familiar with the virtues of Reliable Jacks. He will be glad to help you with a selection of RELIABLES.

WRITE TODAY FOR FREE CATALOG You owe it to yourself to know all about the complete line of Reliables. Write for free catalog today.

RELIABLE JACK COMPANY, 1401 W. Second St., DAYTON, OHIO

EXTRA EVERY MINUTE

ANOTHER CUBIC FOOT OF AIR!



A WAYNE 1½ H.P. Compressor produces a cubic foot of usable air more every minute than the average compressor of the same horsepower. Figured on a basis of displacement capacity alone, it's the biggest value on the market! And you also get the added convenience of more air when you need it, with lower power cost.

WAYNE AIR COMPRESSORS

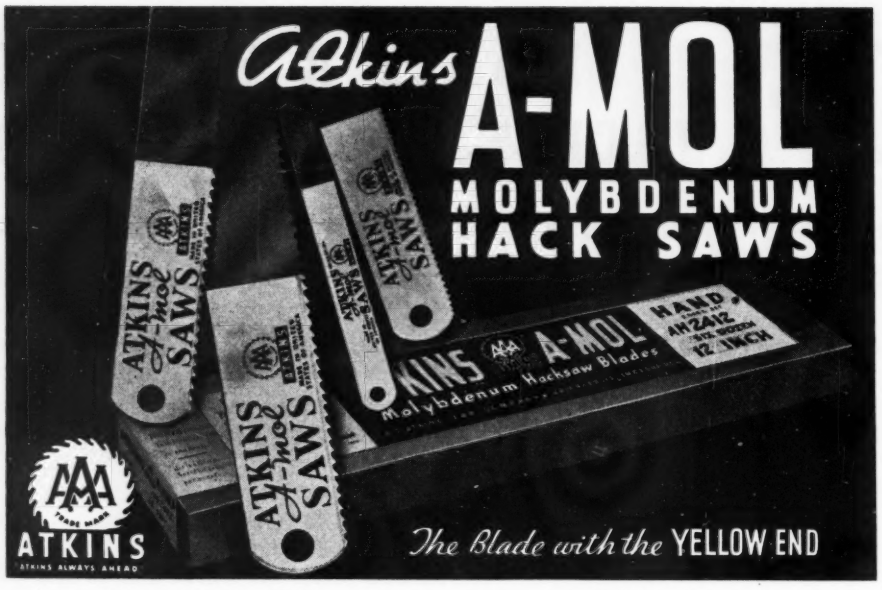
THE WAYNE PUMP CO. • Dept. MA-339 • Fort Wayne, Ind.

Please send your new booklet about Air Compressors.

NAME .....

ADDRESS .....

CITY..... **STATE**.....



If your shop prefers molybdenum hack saws to Atkins "Silver Steel", we make them in the same tooth designs—same factories—same standards, processes and skill.

On iron, brass, bronze or special steels, both types perform about equally, and will cut each other. But when it comes to the toughest jobs some mechanics prefer one, while others are equally sure the other is "a little better".

A fortunate combination of metals, methods and designs have produced not only one outstanding type of saw but two to choose from. Try both and whether or not you notice a difference, you will notice improved performance with both Yellow Ends and Blue Ends.

E. C. ATKINS AND COMPANY, 423 S. Illinois St., Indianapolis, Ind.

Atkins A-MOL MOLYBDENUM Hack Saws

A SENSATIONAL NEW GASKET PASTE

- NEVER HARDENS OR BAKES TO METAL
- PROTECTS OLD or NEW GASKETS
- UNAFFECTED BY GAS, OIL, MOST ACIDS HEAT or COLD
- NO WAITING NECESSARY

SEALCO
TRADE MARK

GOOD FOR 1000 USES

Forms an effective seal for threaded joints. Yet leaves them free and uncorroded, so that they part freely when desired.

Inquiries from Mechanics, Dealers and Jobbers Invited.

TRY IT FREE! *Now*

SPECIAL LIMITED OFFER
Regular 40c Tube

will be sent you absolutely FREE if you write immediately.

Just clip this ad, write your name and address clearly in the margin and mail at once.

SEALCO BY-PRODUCTS CO., Inc.
BLUEFIELD, WEST VIRGINIA

C.S.R.A. to Open Season At Dayton Track in April

Speed events sanctioned by the Central States Racing Association will get under way April 10 with opening of the Dayton (Ohio) Speedway as a high-banked oval. Tons of earth are being piled on the half-mile course to form the steep surface similar to the angle of the old-time board speedways.

Frank Funk, who recently purchased the speed plant from the directors who operated the five-eight mile flat course for several years, announced that the track would be ready for its baptism of speed on April 1. At that time work will be rushed to completion on the huge covered grandstand and buildings.

Plans for the Dayton operation call for night racing after the June race. Because of the sultry daytime weather of the Dayton section, summer races will be staged at night until the daytime events are resumed in the fall.

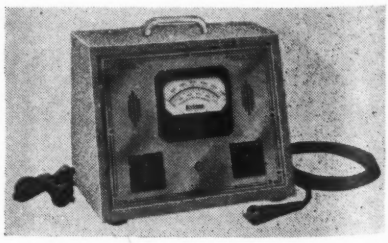
On May 7 the half-mile Jungle Park track at Rockville, Ind., will open its season schedule. A week later, on May 14, the half-mile Greenville, Ohio, oval will join the circuit; May 21, Fort Wayne, Ind., will be the speed scene and on May 28, the "daddy" of the high banked tracks of the half-mile type—Winchester, Ind.—will begin a crowded schedule.

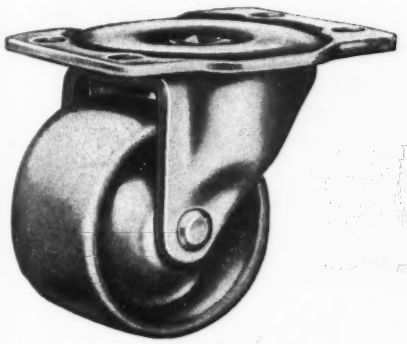
Outstanding among the rules adopted at the 1939 meeting of the CSRA recently was the demand that race operators pay a minimum of $1,400 in a Class "A" race program. Of the amount, $1,000 is the minimum prize slip for the competitive events and the $400 must be added for time trials. In Class "B" programs the prize purse must total $500 for competitive events plus $250 for time trials.

Distinction in the two classes calls for motor limitation of 214 cu. in. piston displacement for Class "B" and 366 cu. in. for Class "A." Superchargers were approved for all CSRA racing with the stipulation that cars of more than 150 cu. in. carrying "blowers" must compete in the top class.

Lanoke Instruments

Eliminate guesswork from your motor tune-up operations by using Lanoke testing instruments made by Lanagan & Hoke, Inc., 1638 Hunting Park Ave., Philadelphia, Pa. New additions to the line include Model 112B Condenser Tester, Model 201B Electric Tachometer (illustrated) and Model 103B Fuel Analyzer. All instruments guaranteed by the manufacturer against defective workmanship and material for one year. Complete information and prices will be supplied by the manufacturer.





HULBERT'S
No.

888

Creeper Casters Stand Up!

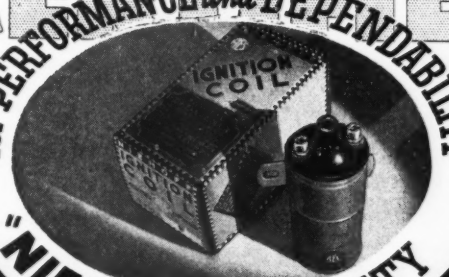
- Specially made for HULBERT'S *SMASHPROOF* BRAND creepers, but will fit most other brands.
- 1¾ inch iron wheels. 1-1/16 inches wide.
- Over-all height 2¼ inches; keeps creepers close to floor.
- Equipped with thread guards and wheel spanner bushings.
- Permanently lubricated axles; require no attention.
- Can be used to replace the cheap tin casters which come on other creepers.

SET OF FOUR
Net Price
$1.25

Sold by all leading Jobbers

HULBERT CREEPER CO. • Ashtabula, Ohio

★ CERTIFIED for PERFORMANCE and DEPENDABILITY



"NIEHOFF" QUALITY TAKES *Resistance* OUT OF COIL SALES

The Niehoff High Speed, Heavy Duty "H" Coil is scientifically engineered to adequately meet the exacting demands of all modern six, eight and twelve cylinder motors. Avoid comebacks, dissatisfied customers and profit losses by featuring this type "H" coil that is giving full satisfaction every day to thousands of car owners. See the big, powerful spark that guarantees easy starting with minimum battery drain, and provides plenty of reserve power to handle radio and other accessories. Perfectly balanced to deliver the punch needed for sure starting in cold weather. Take advantage of this certified sales opportunity. See your jobber TODAY and assure yourself of Bigger ignition parts Profits. Attractive catalog with price list on request. Arrange NOW for a Bigger Profit margin by selling the GENUINE NIEHOFF LINE.

BRANCH: 1342 S. Flower St., Los Angeles, Cal.

C. E. NIEHOFF & CO.
232 W. SUPERIOR ST · CHICAGO, ILLINOIS
★ENGINEERED FOR ACCURATE PERFORMANCE AND DEPENDABILITY★

Safety Turning

DIFFERENT PERFECTLY PRACTICAL

-SIGNACATOR-
Trade Mark Reg. U. S. Pat. Off.

DIRECTION SIGNAL SYSTEM

SUCCESSFUL beyond expectation . . . because K-D SIGNACATOR is the ONLY REALLY selective and automatic system. Protects driver, vehicle, pedestrians, property. Challenges comparison. Built, engineered and sold on quality . . . like all other K-D PRODUCTS.

Write for details

Members by Invitation—Rice Leaders of the World Association

The K-D Lamp Co.
CINCINNATI, O.

Flare

WAXHIDE
CLEANER & POLISH

Waxhide Cleaner is a highly efficient haze and scum remover. It greatly simplifies cleaning jobs and provides a wide margin of saved time with its extremely rapid action.

Auto Body Liquid Waxhide is more than a polish—it is actually a complete protection against weather wear. Contains carnauba wax, which provides a tough, resistant surface coating with a brilliant luster.

Waxhide Cleaner and Auto Body Liquid Waxhide will not break down and separate. They remain in perfect solution at all times.

Outstanding Items In A *Complete* Automotive Chemical Line.

To build lasting volume at greater profits feature Flare Automotive Chemicals.

FLARE (formerly Flash) LABORATORIES 2858 West Kinzie Street CHICAGO, ILLINOIS

You can give BETTER SERVICE with the "KING" System of Motor Tune-Up

THE "KING" MT-190 $185.00

SOLD ON DEFERRED PAYMENTS

Your customers want you to accurately and quickly locate trouble, and you can do just that with the "KING System" of Motor Tune-up. In the automotive repair business it is imperative that you give good service in order to hold your present trade and get new customers. The "KING" MT-190 will soon pay for itself in any shop—the following are among the many tests it will make: Coils, Relays, Starter, Battery, Armature, Generator, Continuity, Fuel Pumps, Spark Plugs, Carburetors, Condensers, Cut-outs, Cables, Ground, Complete Ignition, Voltage Regulators, Cylinder compression, Bulbs (All Types), Timing. A rheostat controls varying line voltages. Coils can be tested on or off the car, with or without engine running. Always remember that "KING" Testers will help build your business and increase your profits.

Nothing like the NEW "KING" Distributor Drive

All the guess work has been taken out of Distributor testing because tests are NOW made under actual "driving conditions." The "KING" Distributor Drive uses a standard coil and 6-volt battery. It operates on the stroboscopic principle and is designed for synchronizing and adjusting breaker points, checking spark retard and advance, governor action, cam dwell, and will also show defective breaker points, worn bushings and bearings. This new method consists of a STATIONARY source of light and a rotating disc with a light slot to indicate firing points on a FIXED calibrated segment of 90 degrees.

$92.50

KING WELDERS

"KING" Welders are easy to operate and so efficient that you can now do your own welding. This is far better than sending welding jobs to outside shops, and it also makes extra profits for you. The "KING" Welder W-6 has a capacity of 250 amperes with 18 heat stages ranging from 15 to 250 amperes. The heat stages are selected by a simple plug-in arrangement. There are no moving parts to wear or get out of order.

Welder W-6

Ask your Jobber or Write us Jobber's Name

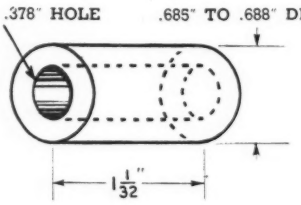
The ELECTRIC HEAT CONTROL Co.
9123 INMAN AVE. CLEVELAND, OHIO
KING-Good Products Since 1914-KING

Trouble Shooting

(*Continued from page* 17)

nections, interference with the vacuum hose clamp at the speedometer cable or lack of lubrication of the vacuum cylinder. To lubricate the vacuum cylinder piston, disconnect the vacuum hose and shift the transmission into second gear. Put ½ ounce of shock insulating fluid into the cylinder through the vacuum inlet tube. Then shift into high gear and put another ½ ounce of shock insulating fluid in through the vacuum inlet tube. Work the piston back and forth between second and high before reinstalling the vacuum hose. If this does not correct the condition it may be necessary to clean and lubricate the transmission operating lever system, as previously covered.

Creeping out of gear may be caused by interference with the vacuum hose clamp or by lack of lubrication of the operating lever system. Should it be considered necessary to adjust the valve in the vacuum cylinder, it is first necessary to make an adjusting bushing, details of which are given in the accompanying illustration. Re-



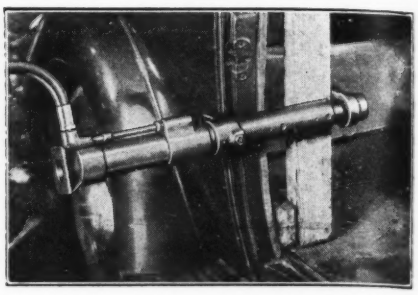
move the boot from the operating lever system and remove the clevis pin from the vacuum cylinder piston rod yoke and reactionary lever system. Remove the two shift control rod links, and push the piston into the cylinder to provide room for making adjustments.

Thread the adjusting bushing through the eyes of the valve links, then raise the bushing with the links inside the piston rod yoke and install the clevis pin through the yoke and bushing. With the engine running, move the valve links away from the cylinder until all clearance between the special adjusting bushing and the clevis pin is toward the front of the car. In this position the piston rod should move slowly outward.

Next move the valve links toward the cylinder until all the clearance between the bushing and the clevis pin is toward the rear of the car. The piston rod should now move slowly inward.

If the piston will move outward but will not move inward, the valve links are adjusted too far toward the cylinder on the valve rod. Remove the clevis pin and unscrew the valve links on the valve rod ½ turn at a time until the proper valve action is obtained. If the piston moves inward but not outward, screw the valve links on to the valve rod ½ turn at a time.

When the transmission blocks out of gear, check the movement of the selector lever on the transmission cover by disconnecting the selector rod and moving the rod and lever the full distance forward and backward. If the selector rod is bent, making it too long, replace with a new one. If



POWER PLUS
Will Handle Jobs Requiring Direct Pull

Perfection Power-Plus Hydraulic Jack and fittings will supply direct pull—concentrated to a one-inch radius—for the repair of box channels, rear trunk racks, door posts, etc.

Two modern Hydraulic Perfection Power-Plus units will tackle any type of body aligning, frame work, fender straightening, knee action adjustment, steel running board straightening.

Speed, Power, Dependability, Accessibility, Adaptability—you'll find all five in the Perfection Power-Plus Jack, the only double-acting PUSH-PULL hydraulic jack.

G. A. C. MANUFACTURING CO.
ASHLAND, OHIO

FAST-MOVING MONEY-MAKER
Emblemized KEY CHAIN
NEW • NOVEL

Genuine Catalin with antique bronze medallion insert of St. Christopher, Masons, Knights of Columbus and Shrine. Available in natural onyx, beige, Brazil onyx, Morocco red and mottled gray. 24 on an attractive 3-color display card. Write today for details.

RETAIL PRICE 25c LIBERAL DISCOUNT
SINKO TOOL & MFG. CO
351 N. Crawford Ave., Chicago

TIMKEN
TAPERED ROLLER BEARINGS
THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

We are telling 40,000,000 MOTORISTS:
EVEREADY PRESTONE
TRADE-MARKS
ANTI-FREEZE
Costs More by the Gallon... LESS by the Winter
WILL YOU CASH IN?

ALL WAYS

● Made only of the best materials . . . by modern methods exclusive with this company . . . Gardiner Acid Core Solder assures the dependable results, maximum economy and consistent performance so important to car manufacturers, body builders, garages and repair shops.

Its quick acting flux permits fast, clean work. Unusually high tensile strength insures lasting bonds. Yet Gardiner Solder costs less than "nameless" solders that lack its advantages of high quality and dependability.

The Gardiner quality line includes Acid and Rosin Core Solders, Solid Wire, Bar and Body Solders . . . also Permanent Lining Babbitt metal. For best results . . . always and all ways . . . specify Gardiner-made products.

Gardiner METAL CO.

4839 S. Campbell Ave., Chicago, Ill.

DON'T FILE POINTS!

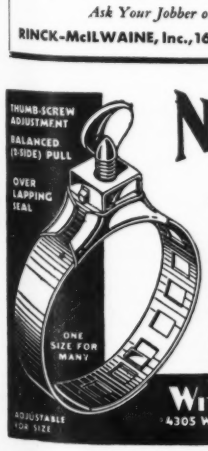
Flex-Stone
REG. U.S. PAT. OFF.

Flexible Contact Dresser

- Takes the hardest of Tungsten Points.
- Bends in where a file can't reach.
- Cleans and Dresses all Electrical Contacts.

Ask Your Jobber or Write Direct

RINCK-McILWAINE, Inc., 16 Hudson St., New York



TRADE MARK
NOC-OUT
HOSE CLAMPS

THE HOSE CLAMP WITH THE THUMB SCREW

Seals absolutely against leakage of anti-freeze, radiator connections, or heater hose. Type A, Adjustable, the clamp with the thumb screw, 1 size fits many. Type GHH for heater hose. Type GBB for booster brakes.

WITTEK MFG. CO.
4305 W. 24th Pl., Chicago, U. S. A.

the selector control lever does not move forward far enough, check the assembly limits of the steering column unit.

To eliminate excessive back-lash in the forward and backward movement of the gear shift lever, tighten the clamp bolt that holds the shift control lever to the control shaft.

Aircooled Motors Expands Facilities

A new building, adding about 6800 sq. ft. to the factory of the Aircooled Motors Corp., Syracuse, N. Y., will be used primarily for assembly operations. Production lines in the older part of the plant are being rearranged, with the addition of new machinery, and initial production on a White Co. order for 4500 4CHO-150 Franklin engines is reported now under way at the rate of 25 engines a day.

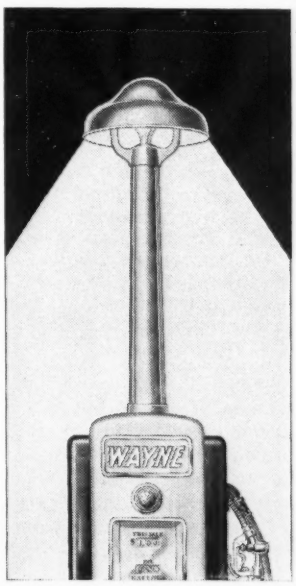
Orders on the books for the 4AC-150 aircraft engine include one for 750 units for "Cub" airplanes and one from the "Taylorcraft" organization. Stock sizes of Franklin engines are being offered as standard equipment with Davey compressors.

Work was completed about Feb. 1 for the approved-type certificate on a 60 hp., 171 cu. in. version of the aircraft engine. The engine is a 4-cyl., horizontal opposed job, 3⅞ in. by 3⅝ in.

When the present program of the company is completed, it will include expanded test-stand facilities and the installation of eight dynamometers.

Gas Pump Light

Light up your service station by spotlighting the gas pump island. The new Pylon light introduced by The Wayne Pump Co., Tecumseh & Cochran Sts., Fort Wayne, Ind., mounts on top of the gas pump and illuminates it and the area surorunding the pump,



providing working light for all operations around the car. Wayne also offers another light, Model 585, so constructed that an advertising globe can be used with it.

THE ANSWER TO YOUR

FITTING PROBLEM

at a Bargain

A Selection of 3 Assortments

114 Fittings • 199 Fittings • 226 Fittings

● Here's your answer to your prayer. This fitting cabinet contains complete assortments of tube fittings *when* and *where* you want them. The 80 compartments of this sturdy, 4-drawer cabinet will carry *all* the necessary fittings in the popular and wanted numbers. Remember—90% of all automobiles in the country use Weatherhead fittings—Weatherhead knows *which* fittings to furnish.

Placed where it's most handy, this bright red enameled cabinet takes up almost no room at all.

Each Assortment Priced at a Bargain

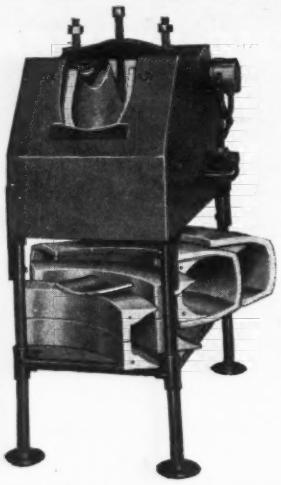
The four drawer cabinet and fittings are priced at *less* than you ordinarily pay for the fittings alone.

Your Jobber has Weatherhead. Ask him!

THE WEATHERHEAD CO.
Cleveland, Ohio

Weatherhead

FITTINGS • FUEL LINES • BRAKE PARTS
HYDROMETERS • DASH CONTROLS



Our Hobby for Which We Lobby Precision, Efficiency, and Economy of Operation

The Best Is None Too Good

Type C. C. Mold for pleasure car tire and truck tire repair, gas, electric or steam line.

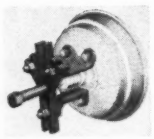
Write for particulars to

CHASE MFG. CO.

3218 Delmar Blvd., St. Louis, Mo.

COMPLETE WHEEL PULLING OUTFIT...

Modern service stations need this Springfield No. 500 Wheel Pulling outfit. Service men like the way it pulls hard-to-get-off gears, wheels, hubs, bearings, etc. No extra parts to buy. Costs 1/3 to 1/4 less than comparable equipment. Fits all 1929-39 cars. See your jobber or write direct.



only $7.50 delivered

SPRINGFIELD WHEEL PULLER

SPRINGFIELD WHEEL PULLER COMPANY, SPRINGFIELD, OHIO

Why Pay More?

Why Accept less?

Valley Battery Chargers quickly repay their low first cost in added profits to your shop. Guaranteed for two years.

Model G-12 charges 1 to 12 6-volt batteries.

NOW ONLY $25.00

Other sizes at equally low prices. Write for FREE bulletin.

Valley Electric Corp.

4221 Forest Park Blvd. • St. Louis, Mo.

Designed for Diesels

(*Continued from page* 19)

double unit accommodating pumps of either rotation and of any size. All types of injectors can be tested.

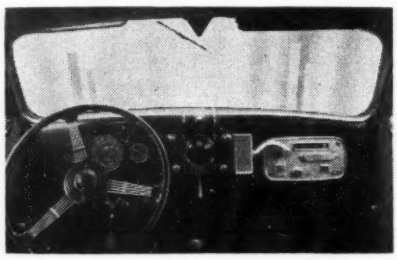
The nozzle stand is ventilated by a Sirocco type fan and uses an independent power source to supply oil under as much as 1700 pounds pressure to the nozzle, thus meeting all possible requirements. Test facilities are also provided for special injectors and fuel supply pumps.

"If the tool board didn't make us think too much of a dentist's layout, we'd enthuse over it," says Mr. Sirotek, "but it's pretty neat, as the picture shows. It eliminates lost motion, and lost tools, since this is a closed room and things stay where they are placed. For comfort and safety wooden non-slip mats cover the floors. The shop truly is immaculate, even the grinder being placed outside the room to eliminate any chance of flying abrasives or dust."

Diesel service work is in charge of Henry Sirotek, son of the president of the company. Henry Sirotek has studied Diesel engineering at Armour Institute in Chicago as well as under Bosch engineers.

Glovebox Taximeter

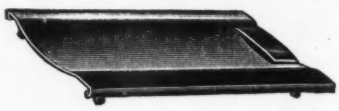
The Glovebox Taximeter Corp., 709 Electric Bldg., Houston, Texas, has developed a taximeter which fits into the glove compartment in the instrument panel. The face of the taximeter fits flush with the instrument panel, thereby providing convenient seating



capacity in the front seat. There is no obstruction to vision, and yet the amount dials are clearly visible to back seat passengers. The installation of the Glovebox Taximeter does not damage the instrument panel since it is attached to an adaptor plate designed for that particular make car. The original door of the glove compartment can be reinstalled when the car is removed from taxi service. The taximeter operates from the speedometer, while waiting and slow traffic charges are recorded by a clock.

For complete information and prices, write the manufacturer.

SOLID STEEL HEAVY DUTY



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Ruggedly built. Ball-bearing Capacitor type motor protects against burn-out. Adjustable tool rests. Guaranteed 1 year **$19.50**

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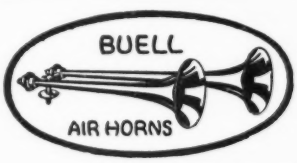

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